

Albury Regional Job Precinct

Technical Report - Soils, Geology and
Contamination

21 October 2022

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Albury Regional Job Precinct

Technical Report - Soils, Geology and Contamination



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Acronyms and Abbreviations

Name	Description
ACM	Asbestos Containing Material
AHD	Australian Height Datum
AMG	Australian Map Grid
ASC NEPM	National Environment Protection (Assessment of Site Contamination) Measure
ASS	Acid Sulfate Soils
BTEX	Benzene, Toluene, Ethylbenzene and Xylenes
CLM Act	<i>Contaminated Land Management Act 1997 (NSW)</i>
CoPC	Contaminant of Potential Concern
CSM	Conceptual Site Model
DP	Deposited Plan
DPI	Department of Primary Industries
DSI	Detailed Site Investigation
EPL	Environment Protection License
ESA	Environmental Site Assessment
m	Metre
m AHD	Metres Above Australian Height Datum
m bgl	Metres Below Ground Level
NEPC	National Environment Protection Council
NEPM	National Environment Protection Measure
NSW EPA	New South Wales Environment Protection Authority
OCP	Organochlorine Pesticides
OPP	Organophosphorus Pesticides
PACM	Potential Asbestos Containing Material
PAH	Polycyclic Aromatic Hydrocarbons
PFAS	Per and Polyfluoroalkyl Substances
PFOA	Perfluorooctanoic Acid
PFOS	Perfluorooctane Sulfonate
POEO Act	<i>Protection of the Environment Operations Act 1997(NSW)</i>
PSI	Preliminary Site Investigation
RAP	Remedial Action Plan
SAQP	Sampling and Analysis Quality Plan
SEPP	State Environmental Planning Policy (Resilience and Hazards) 2021
Site	This is the focus of investigation for the Albury RJP and is approximately 1,179 hectares in size.
SVOC	Semi-volatile Organic Compounds
TRH	Total Recoverable Hydrocarbons
VOC	Volatile Organic Compounds

EXECUTIVE SUMMARY

Environmental Resources Management Australia Pty Ltd (ERM) was engaged by the Department of Regional NSW (DRNSW or “the Client”) to undertake a program of environmental and heritage studies to support the development of the Albury Regional Job Precinct (Albury RJP) Master Plan. The location and boundaries of the Albury RJP (“the RJP” or “the Site”) are illustrated on **Figure 1**.

This report identifies the constraints and opportunities in relation to the geology, soils and contamination conditions within the RJP within the context of the proposed Master Plan (4 March 2022). This technical report has been designed to test the preferred structure plan that was developed as part of an Integration Workshop and aims to establish the relevant specifications and requirements to assist in the development of the Master Plan.

ERM has prepared this technical report based on a desktop review of background information relating to soil salinity, acid sulfate soils and potential for contamination at the site and preliminary investigations including a site inspection and soil sampling at 20 targeted locations within the Albury RJP.

In summary, the key findings of the assessment were:

Salinity

- The potential presence of localised salinity and potentially aggressive soils and foundation hazards across the RJP has been highlighted by the available soils mapping. The preliminary assessment indicates that surface soils are typically non-saline, with sodic and highly sodic conditions reported in the northern and eastern parts of the RJP, and that surface soils are typically non-aggressive or mildly aggressive to steel and concrete (2 samples indicated mildly aggressive to concrete based on pH <5.5).
- Whilst the salinity, sodicity and aggressivity soil conditions are unlikely to represent a significant constraint on the proposed Master Plan, and ongoing management is unlikely to be required, the findings of the preliminary assessment should be considered in the development design process and the selection of suitable construction materials. A geotechnical assessment is likely to be a requirement of any detailed design for development within the RJP; this should be designed to consider local soil salinity and aggressivity conditions to inform the selection of appropriate design and construction materials for the protection of built structures. A more detailed assessment of localised salinity and sodicity should also be considered in areas proposed for future conservation or recreation where vegetation planting is proposed.
- In addition to the above, it is noted that salinity conditions are dependent on several variables, which include surface water infiltration to soil and groundwater levels which may be modified by development in the area. The application of the principles of Water Sensitive Urban Design should be considered in the proposed development areas to mitigate potential changes to soil water levels and salinity conditions in the catchment. The impact of the extraction of groundwater for beneficial re-use on catchment level salinity conditions should also be considered.

Acid Sulfate Soils

- The available soil mapping indicates there is a high probability of acid sulfate soils being present on the majority of the site, with an extremely low probability present on the western slopes of the site. Whilst the preliminary assessment did not identify Actual or Potential ASS (AASS or PASS) in the sampled locations, some areas of acidic soils were identified.
- Given that much of the Investigation Area falls within mapped areas of high risk for ASS, it would be prudent for any future development undertaken within these mapped high risk areas to further consider the potential for occurrence of inland ASS as part of the site specific geotechnical assessment /design. This is particularly relevant to any development where foundations, services or other structures are likely to extend below the water table, require dewatering which may lower the water table, or otherwise have potential to oxidise PASS.

Potential Contamination

- A Preliminary Site Investigation (PSI) was undertaken for the Site which comprised a desktop review and a site inspection (no sampling was undertaken) to identify potential contamination. Based on the findings of the PSI, potential contamination was identified at specific sites which currently (or formerly) operated potentially contaminating industries and/or activities, including:
 - VISY Paper Mill,
 - Overall Forge
 - Ettamogah Rail Hub
 - Circular Plastics Australia (PET) Pty Ltd (plastics recycling facility)
 - Rural industry (primarily stockpiling of soils, holding yards for agricultural supplies, chemicals and vehicles) located on Wagga Road in the southern part of the RJP.
- The remaining land has the broad potential for contamination associated with hazardous building materials (such as asbestos) associated with built structures and/or infrastructure (current or former), chemical storage and use including but not limited to underground or above-ground chemical storage tanks and uncontrolled waste dumping (as observed at 2 sites).
- The Master Plan (dated 4 March 2022) proposes some changes to land-use, in most instances these changes are predominantly a change to a similar or less sensitive land-use from a contamination perspective.
- Generally, the triggers for further contamination assessment under Clause 4.6(4) of the *State Environmental Planning Policy (Resilience and Hazards) 2021* (the SEPP) would only be met where the proposed changes to land-use under the Master Plan for the Albury RJP are (i) for residential, educational, recreational or child care purposes or for the purpose of a hospital; AND (ii) the land is not currently or formerly used for potentially contaminating activities (as listed in Table 1 to the contaminated land planning guidelines). Where the land is currently used for potentially contaminating activities at the specific industrial sites (as listed above), and no change is proposed under the Master Plan, it is unlikely that further assessment would be triggered under Clause 4.6(4) of the SEPP.
- In addition to the above it is important to note that there is a broad potential for some contamination to be present on all lands across the RJP associated with hazardous building materials, small scale chemical storage and use and uncontrolled waste dumping, which should be assessed further prior to approval of development to prevent potential exposure to contamination hazards. The guidance provided in Contaminated Land Planning Guidelines (Draft) should be considered in relation to the application of due diligence by the Consent Authority in consideration of a process for assessment of potential for hazardous building materials (e.g., asbestos) prior to development commencement.

1. INTRODUCTION

Environmental Resources Management Australia Pty Ltd (ERM) was engaged by the Department of Regional NSW (DRNSW or “the Client”) to undertake a program of environmental and heritage studies to support the development of the Albury Regional Job Precinct (Albury RJP) Master Plan. The location and boundaries of the Albury RJP (“the RJP” or “the Site”) are illustrated on **Figure 1**.

This report identifies the constraints and opportunities in relation to the geology, soils and contamination conditions within the RJP within the context of the proposed Master Plan (4 March 2022).

This technical report has been designed to test the preferred structure plan that was developed as part of a series of Integration Workshops and aims to establish the relevant specifications and requirements to assist in the development of the Master Plan.

1.1 Project Background

The Regional Job Precincts (RJPs) have been identified by the NSW Government as areas of land that are of local significance based on economic enablers. To attract investors, the NSW Government is seeking to create a place-based planning framework that streamlines the approval process, removing statutory barriers, and enhancing investment certainty.

This investigation seeks to deliver outcomes in the following RJP objectives:

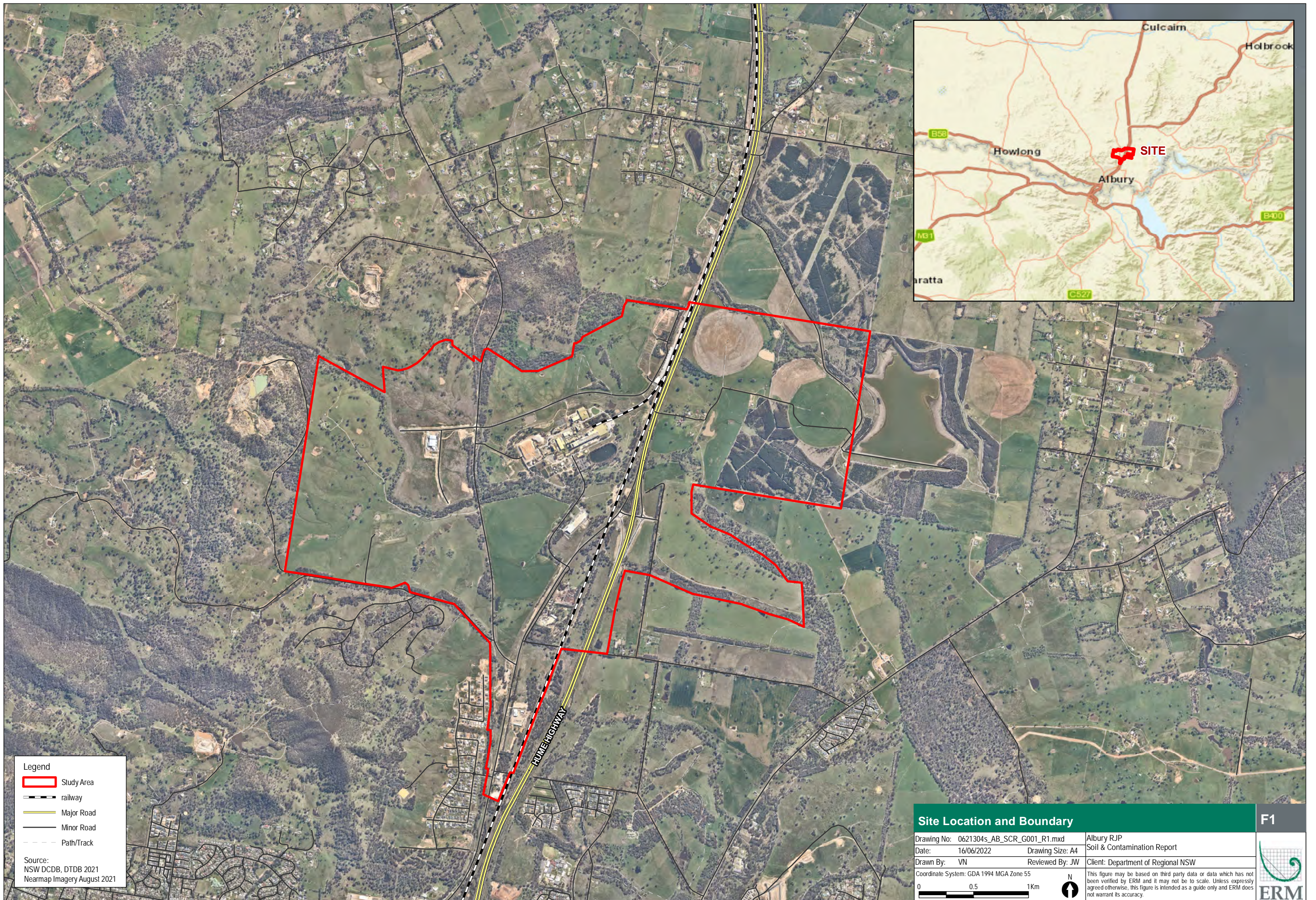
- Remove planning complexity and delays as a barrier to regional economic growth; and
- Focus on outcomes and evidence, rather than compliance and assessment.

DRNSW have identified three precincts for assessment as part of this engagement:

- Albury;
- Richmond Valley; and
- South Jerrabomberra.

The purpose of the RJP process is to support regional investment and job creation. This is achieved through the creation of precincts that are attractive to investors through streamlined statutory planning processes, identification of land uses that facilitate complementary businesses, and a whole-of-Government approach to resolution of historic development constraints.

The Australian Government announced a pilot Regional Deal for Albury Wodonga on 20 March 2019 and it is currently in the negotiation phase. The regional deal is an opportunity to ensure that Albury Wodonga prospers over the next decade by supporting population growth and economic development while also ensuring it remains a nationally-significant, liveable and prosperous region. The Albury Regional Job Precinct will leverage the opportunities associated with an expanded NEXUS Industrial Precinct to create a hub of advanced manufacturing, circular economy and recycling, agribusiness, freight and logistics services, and create more jobs for the region.



Legend

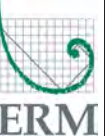
- Study Area
- railway
- Major Road
- Minor Road
- Path/Track

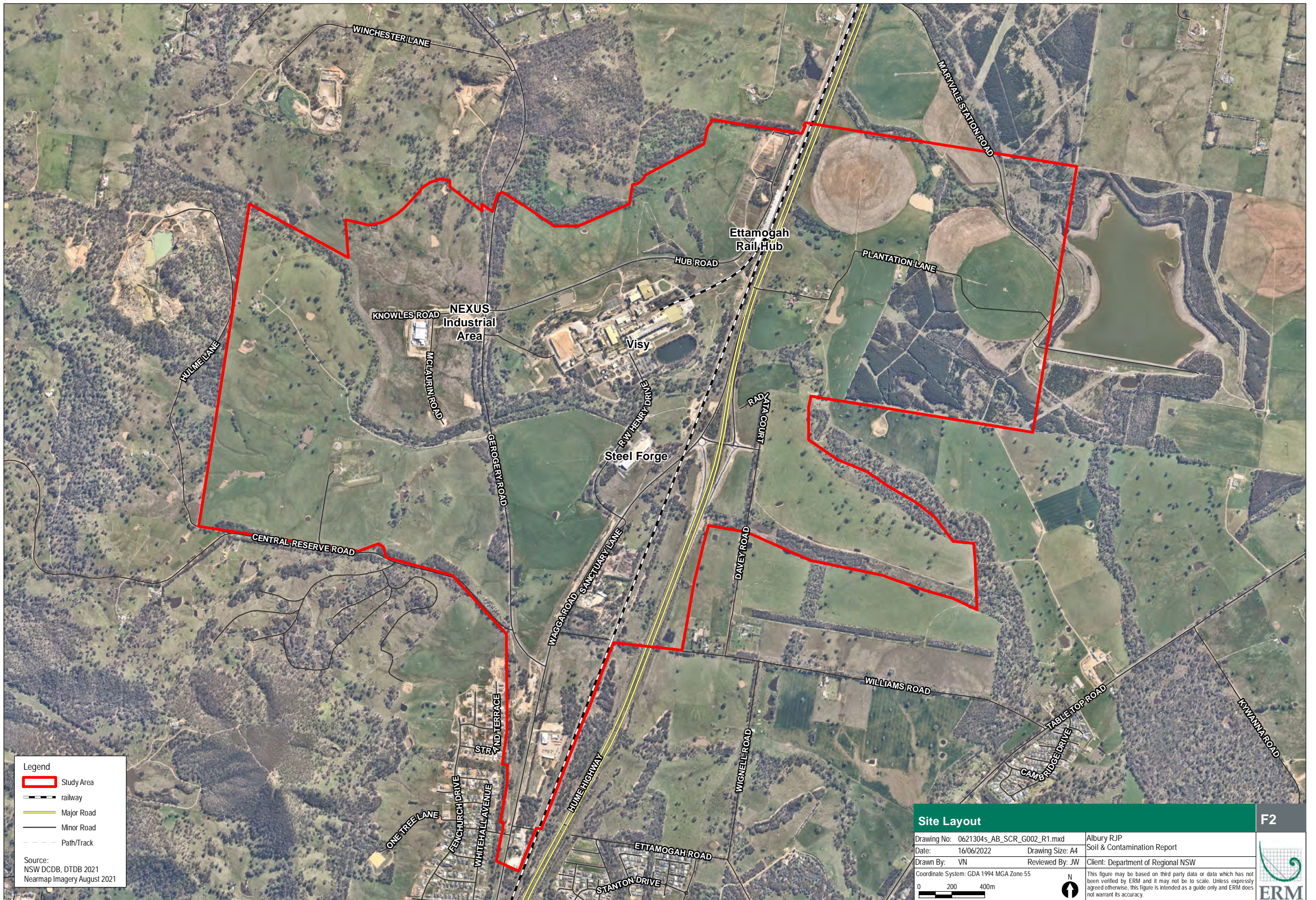
Source:
NSW DCDB, DTDB 2021
Nearmap Imagery August 2021

Site Location and Boundary

F1

Drawing No: 0621304s_AB_SCR_G001_R1.mxd	Albury RJP
Date: 16/06/2022	Soil & Contamination Report
Drawn By: VN	Reviewed By: JW
Client: Department of Regional NSW	
Coordinate System: GDA 1994 MGA Zone 55	
0 0.5 1Km	
	<p>This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.</p>





Legend

- Study Area
- railway
- Major Road
- Minor Road
- Path/Track

Source:
NSW DCDB, DTDB 2021
Nearmap Imagery August 2021

Site Layout		F2
Drawing No: 0621304s_AB_SCR_G002_R1.mxd	Albury RJP	
Date: 16/06/2022	Drawing Size: A4	
Drawn By: VN	Reviewed By: JW	Client: Department of Regional NSW
Coordinate System: GDA 1994 MGA Zone 55		This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.
 0 200 400m		

1.2 Investigation Area

The Investigation Area is approximately 1,199 hectares (ha) in size and is located north-east of the Albury Town Centre within the suburb of Ettamogah. The Investigation Area is bisected by the Hume Highway and Great Southern Railway. The Investigation Area is located in the Albury City Local Government Area (LGA) and includes the following key businesses:

1. VISY (formerly Norske Skog) paper mill;
2. Ettamogah Rail Hub;
3. Overall Forge iron and steel forging;
4. Circular Plastics Australia PET recycling plant; and
5. Existing Council industrial subdivisions within NEXUS.

The layout of the Investigation Area is shown in **Figure 2**.

1.3 Purpose of this Report

This Technical Report identifies the constraints and opportunities in relation to the geology, soils and contamination conditions within the RJP within the context of the proposed Master Plan (dated 4 March 2022).

A Baseline Analysis Report was prepared by ERM which presented a desktop analysis of soils, contamination and geology issues at the Site to aid the Client in gaining a preliminary understanding of the potential opportunities and constraints to future development associated with these issues within the Albury RJP.

Subsequent to the Baseline Analysis Report, ERM has undertaken site inspection and targeted soil sampling and analysis along with further desktop assessment of the interactions between the proposed Master Plan and the known opportunities and constraints in relation to soils, geology and contamination. The purpose of this report is to test the preferred structure plan that was developed as part of a series of Integration Workshops and establish the relevant specifications and requirements to assist in the development of the Master Plan.

1.4 Objective

The objective of these works was to undertake a desktop Preliminary Site Investigation (PSI) that refines the current understanding of soils, geology, potential contamination, salinity and soil aggressivity issues at the Site and aid the Client in gaining a preliminary understanding of the potential opportunities and constraints to future development associated with these issues. This information has then been utilised to test the preferred structure plan that was developed as part of a series of Integration Workshops and aims to establish the relevant specifications and requirements to assist in the development and finalisation of the Master Plan.

1.5 Scope of Works

To meet the project objective, ERM completed the following scope of works:

- Review of background information relating to the site, including:
 - Previous investigations relating to site contamination;
 - The NSW Environment Protection Authority (EPA) Contaminated Land Register;
 - Historical and recent aerial photographs;
 - Relevant government databases; and
 - Published soil, geology and topographic maps.

- Preparation of this report; and
- Preliminary investigations including a site inspection and soil sampling.

Investigation work was conducted with reference to relevant parts of the following guidelines:

- National Environment Protection (Assessment of Site Contamination) Measure 1999 (ASC NEPM (1999)) (as amended May 2013) – herein referred to as the ASC NEPM (2013)
- NSW EPA (2017). *Guidelines for the NSW Site Auditor Scheme* (3rd edition)
- NSW EPA (2020) Contaminated Land Guidelines, Consultants Reporting on Contaminated Land (May 2020)
- Environment Protection and Heritage Council and the Natural Resource Management Ministerial Council (2011) *National guidance for the management of acid sulfate soils in inland aquatic ecosystems, Canberra, ACT.*
- Australian Standard 2159-2009 Piling – Design and Installation (AS 2159-2009)
- Department of Land and Water Conservation (2002), Site Investigation for Urban Salinity
- Aher CR, Stone Y and Blunden B (1998), Acid Sulfate Soils Assessment Guidelines (ASSMAC) Published by the Acid Sulfate Soil Management Advisory Committee, Wollongbar, NSW, Australia
- Aher CR, Stone Y and Blunden B (1998), Acid Sulfate Soils Manual 1998, Published by the Acid Sulfate Soil Management Advisory Committee, Wollongbar, NSW, Australia
- Sullivan, L, Ward, N, Toppler, N and Lancaster, G (2018) National Acid Sulfate Soils guidance: National acid sulfate soils sampling and identification methods manual, Department of Agriculture and Water Resources, Canberra ACT.

2. ENVIRONMENT AND PLANNING LEGISLATION

In order to facilitate an assessment of the proposed impacts of potential soils / contamination issues on the RJP process and in the context of some recent changes to the planning framework within NSW, the following sections provide a brief overview of the relevant legislative framework that will inform the testing of the preferred structure plan and review of the proposed Master Plan.

2.1 *Environmental Planning and Assessment Act 1979 (NSW)*

The *Environmental Planning and Assessment (EP&A) Act 1979* (NSW) is the primary instrument under which planning and development is carried out in NSW. The *EP&A Act* sets out a framework under which the three statutory environmental planning instruments - State Environmental Planning Policies (SEPPs), Regional Environmental Plans (REPs) and Local Environmental Plans (LEPs) - are made. The *EP&A Act* is also the overarching instrument that assigns responsibility for the regulation of contaminated land that is not considered to be contaminated significantly enough to warrant regulation by EPA.

2.2 SEPP (Resilience and Hazards) – replacement of SEPP55

State Environmental Planning Policy (Resilience and Hazards) 2021 (which incorporates, as Chapter 4, guidance formerly included in SEPP No. 55 *Remediation of Land*) is one of the key statutory planning instruments used to regulate contaminated land under the *EP&A Act*. Specifically, Clause 4.6 of the *SEPP (Resilience and Hazards)* prohibits a consent authority from approving development on land unless it has discharged its responsibilities with regard to assessing the contamination status of that land.

Importantly, in the context of this report, Clause 4.6 (4) sets out the specific circumstances / lands which would trigger a requirement for further assessment of potential contamination as being:

- (a) *land that is within an investigation area,*
- (b) *land on which development for a purpose referred to in Table 1 to the contaminated land planning guidelines is being, or is known to have been, carried out,*
- (c) *to the extent to which it is proposed to carry out development on it for residential, educational, recreational or child care purposes, or for the purposes of a hospital—land—*
 - (i) *in relation to which there is no knowledge (or incomplete knowledge) as to whether development for a purpose referred to in Table 1 to the contaminated land planning guidelines has been carried out, and*
 - (ii) *on which it would have been lawful to carry out such development during any period in respect of which there is no knowledge (or incomplete knowledge).*

2.3 CLM Act

The *Contaminated Land Management Act 1997* (NSW) (CLM Act) is the legislative instrument in NSW which defines “contamination” as follows:

The presence in, on or under the land of a substance at a concentration above the concentration at which the substance is normally present in, on or under (respectively) land in the same locality, being a presence that presents a risk of harm to human health or any other aspect of the environment.

The stated objective of the *CLM Act* is to establish a process for investigating and (where appropriate) remediating land that the EPA considers to be contaminated significantly enough to require regulation. Sites at which the contamination is considered “significant enough to warrant regulation” are therefore regulated by the EPA under the *CLM Act* whilst contamination at other sites (i.e., those where contamination is not considered significant enough to warrant regulation by the EPA) are managed via the land use planning process (normally by the local council). The *CLM Act* provides the EPA with various responsibilities and powers to enable it to effectively regulate and manage significantly contaminated sites in NSW in order to meet the stated objectives of the Act.

3. SITE BACKGROUND REVIEW

3.1 Site identification

The site identification information is presented within the table below:

Item	Description			
Site Address	<ul style="list-style-type: none"> ■ Ettamogah, NSW, 2640 			
Legal Description	<table border="0" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 25%; vertical-align: top;"> <ul style="list-style-type: none"> ■ Lot 4 DP247805 ■ Lot 1 DP1033647 ■ Lot 2 DP1054721 ■ Lot 1 DP504046 ■ Lot 5 DP1070688 ■ Lot 34 DP1121146 ■ Lot 1 DP1054721 ■ Lot 1 DP869535 ■ Lot 33 DP1121146 ■ Lot 1 DP1252889 ■ Lot 4 DP1252889 ■ Lot 2 DP1252889 ■ Lot 3 DP1252889 ■ Lot 3 DP233061 ■ Lot 7003 DP1060806 ■ Lot 35 DP1121146 ■ Lot 321 DP614982 ■ Lot 7004 DP1060806 ■ Lot 1 DP1126922 </td> <td style="width: 25%; vertical-align: top;"> <ul style="list-style-type: none"> ■ Lot 2 DP1126922 ■ Lot 20 DP862667 ■ Lot 21 DP862667 ■ Lot 51 DP1061520 ■ Lot 52 DP1061520 ■ Lot 2 DP823347 ■ Lot 101 DP1000761 ■ Lot 602 DP1163923 ■ Lot 3 DP258810 ■ Lot 7 DP264463 ■ Lot 9 DP264463 ■ Lot 6 DP264463 ■ Lot 21 DP604181 ■ Lot 8 DP264463 ■ Lot 1 DP629660 ■ Lot 10 DP264463 ■ Lot 1 DP905520 ■ Lot 1 DP1157984 ■ Lot 50 DP1061520 </td> <td style="width: 50%; vertical-align: top;"> <ul style="list-style-type: none"> ■ Lot 5 DP1155013 ■ Lot 100 DP1000761 ■ Lot 2 DP1212012 ■ Lot 608 DP1163923 ■ Lot 609 DP1163923 ■ Lot 12 DP1031998 ■ Lot 13 DP235671 ■ Lot 141 DP130012 ■ Lot 12 DP1001042 ■ Lot 123 DP904898 ■ Lot 1 DP1154152 ■ Lot 604 DP1163923 ■ Lot 603 DP1163923 ■ Lot 22 DP1191688 ■ Lot 3 DP1083506 ■ Lot 7 DP247805 ■ Lot 607 DP1163923 ■ Lot 109 DP1146428 </td> </tr> </table>	<ul style="list-style-type: none"> ■ Lot 4 DP247805 ■ Lot 1 DP1033647 ■ Lot 2 DP1054721 ■ Lot 1 DP504046 ■ Lot 5 DP1070688 ■ Lot 34 DP1121146 ■ Lot 1 DP1054721 ■ Lot 1 DP869535 ■ Lot 33 DP1121146 ■ Lot 1 DP1252889 ■ Lot 4 DP1252889 ■ Lot 2 DP1252889 ■ Lot 3 DP1252889 ■ Lot 3 DP233061 ■ Lot 7003 DP1060806 ■ Lot 35 DP1121146 ■ Lot 321 DP614982 ■ Lot 7004 DP1060806 ■ Lot 1 DP1126922 	<ul style="list-style-type: none"> ■ Lot 2 DP1126922 ■ Lot 20 DP862667 ■ Lot 21 DP862667 ■ Lot 51 DP1061520 ■ Lot 52 DP1061520 ■ Lot 2 DP823347 ■ Lot 101 DP1000761 ■ Lot 602 DP1163923 ■ Lot 3 DP258810 ■ Lot 7 DP264463 ■ Lot 9 DP264463 ■ Lot 6 DP264463 ■ Lot 21 DP604181 ■ Lot 8 DP264463 ■ Lot 1 DP629660 ■ Lot 10 DP264463 ■ Lot 1 DP905520 ■ Lot 1 DP1157984 ■ Lot 50 DP1061520 	<ul style="list-style-type: none"> ■ Lot 5 DP1155013 ■ Lot 100 DP1000761 ■ Lot 2 DP1212012 ■ Lot 608 DP1163923 ■ Lot 609 DP1163923 ■ Lot 12 DP1031998 ■ Lot 13 DP235671 ■ Lot 141 DP130012 ■ Lot 12 DP1001042 ■ Lot 123 DP904898 ■ Lot 1 DP1154152 ■ Lot 604 DP1163923 ■ Lot 603 DP1163923 ■ Lot 22 DP1191688 ■ Lot 3 DP1083506 ■ Lot 7 DP247805 ■ Lot 607 DP1163923 ■ Lot 109 DP1146428
<ul style="list-style-type: none"> ■ Lot 4 DP247805 ■ Lot 1 DP1033647 ■ Lot 2 DP1054721 ■ Lot 1 DP504046 ■ Lot 5 DP1070688 ■ Lot 34 DP1121146 ■ Lot 1 DP1054721 ■ Lot 1 DP869535 ■ Lot 33 DP1121146 ■ Lot 1 DP1252889 ■ Lot 4 DP1252889 ■ Lot 2 DP1252889 ■ Lot 3 DP1252889 ■ Lot 3 DP233061 ■ Lot 7003 DP1060806 ■ Lot 35 DP1121146 ■ Lot 321 DP614982 ■ Lot 7004 DP1060806 ■ Lot 1 DP1126922 	<ul style="list-style-type: none"> ■ Lot 2 DP1126922 ■ Lot 20 DP862667 ■ Lot 21 DP862667 ■ Lot 51 DP1061520 ■ Lot 52 DP1061520 ■ Lot 2 DP823347 ■ Lot 101 DP1000761 ■ Lot 602 DP1163923 ■ Lot 3 DP258810 ■ Lot 7 DP264463 ■ Lot 9 DP264463 ■ Lot 6 DP264463 ■ Lot 21 DP604181 ■ Lot 8 DP264463 ■ Lot 1 DP629660 ■ Lot 10 DP264463 ■ Lot 1 DP905520 ■ Lot 1 DP1157984 ■ Lot 50 DP1061520 	<ul style="list-style-type: none"> ■ Lot 5 DP1155013 ■ Lot 100 DP1000761 ■ Lot 2 DP1212012 ■ Lot 608 DP1163923 ■ Lot 609 DP1163923 ■ Lot 12 DP1031998 ■ Lot 13 DP235671 ■ Lot 141 DP130012 ■ Lot 12 DP1001042 ■ Lot 123 DP904898 ■ Lot 1 DP1154152 ■ Lot 604 DP1163923 ■ Lot 603 DP1163923 ■ Lot 22 DP1191688 ■ Lot 3 DP1083506 ■ Lot 7 DP247805 ■ Lot 607 DP1163923 ■ Lot 109 DP1146428 		
Local Government Area	<ul style="list-style-type: none"> ■ Albury City Council 			
Current Zoning	<ul style="list-style-type: none"> ■ B7 Business Park ■ C3 Environmental Management ■ IN1 General Industry ■ R2 Low Density Residential ■ RU1 Primary Production ■ RU2 Rural Landscape Zone ■ RU4 Rural Small Holdings ■ SP2 Special Purposes Zone – Infrastructure 			
Geographical Co-Ordinates	<ul style="list-style-type: none"> ■ 35°59'54"S 146°59'28" E (Approximate centre of Site) 			
Site Location and Site Layouts	<ul style="list-style-type: none"> ■ Figure 1 			

3.2 Site Setting

The following sections summarise the information obtained during the site background and history desktop review.

Copies of all database search results are provided in **Appendix A**.

Item	Description
Site area	1,179 hectares
Current land use	The site covers a large area of various uses, consisting of the following: <ul style="list-style-type: none"> ■ Industrial land consisting of a paper mill, Ettamogah Rail Hub and metal forging facility; ■ Commercial material/vehicle storage and staging yards with associated office facilities; ■ Primary production farming land; ■ Individual farm houses and residential dwellings; and ■ Undeveloped rural land.
Surrounding Land use	The land uses surrounding the site include: <ul style="list-style-type: none"> ■ North: Undeveloped rural land and General Residential; ■ South: General residential, public open recreation and small scale commercial; ■ East: Primary Production and General Residential; ■ West: Undeveloped rural land, former Ettamogah Defence munitions depot and a quarry.
Site Elevation	220 – 300 m relative to Australian Height Datum (AHD)

3.3 Topography

The site and regional topography generally consist of undulating hills, with the central portion of the site being generally flat. The site slopes converge toward the central portion of site, causing a slight valley which trends approximately north-south in the general path of the Hume Highway.

3.4 Hydrology

The nearest natural surface water bodies at the Site were identified as:

- A waste water storage dam located at the paper mill;
- Eight Mile Creek runs through the central portion of the site running approximately east to west; and
- Ettamogah Forest dam, located off the eastern boundary of the site.

A review of aerial imagery also indicates the presence of several ephemeral drainage lines and farm dams located within the Site boundary.

3.5 Geology

Geology mapping from the Geological Survey of NSW Hume 1:50,000 geological map indicates that the Site is underlain by the following geological units:

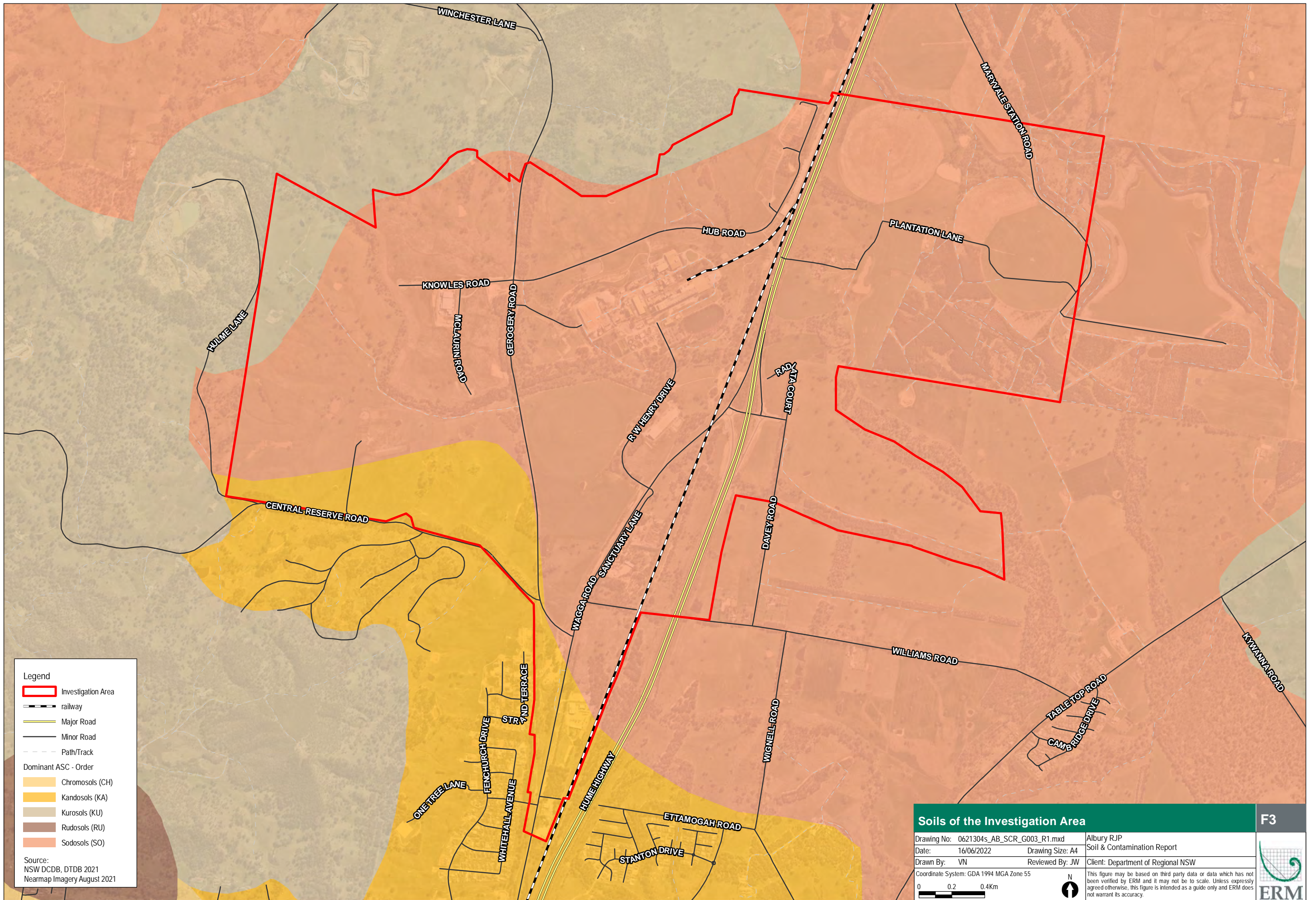
- Quaternary colluvium clastic sediments in low lying areas of the valley. The sediments consist of poorly sorted, weakly cemented to unconsolidated colluvial lenses of polymictic conglomerate with medium to very coarse-grained sand matrix; interspersed with unconsolidated clayey and silty red-brown (Aeolian) sand layers modified by pedogenesis; and
- Quaternary residual deposits of Saprolite on the western hill sides. Residual sediments consisted of weakly-consolidated regolithic residuum such as soil or saprolite mostly developed in-situ as a result of advanced weathering and/or pedogenesis.
- The quaternary sediments are expected to be underlain by Lachlan Orogen granites, as hill crests off the western site boundary are underlain by igneous lithology.

The distribution of soil types within the site is shown in Figure 3, and geology (see Section 3.5) in Figure 4).

3.6 Hydrogeology

Information provided by NSW Department of Industries – Office of Water indicated the following:

- Groundwater aquifers on the site and surrounding buffer area (2 km) were described as porous, extensive highly productive aquifers and fractured or fissured, extensive aquifers of low to moderate productivity;
- A search of registered groundwater bores identified 15 bores within the 2 km search radius. Standing water levels were measured between 1.0 m bgl to 47.3 m bgl; and
- The registered bores are reported to be used for a mix of household, monitoring, and unknown purposes.



Legend

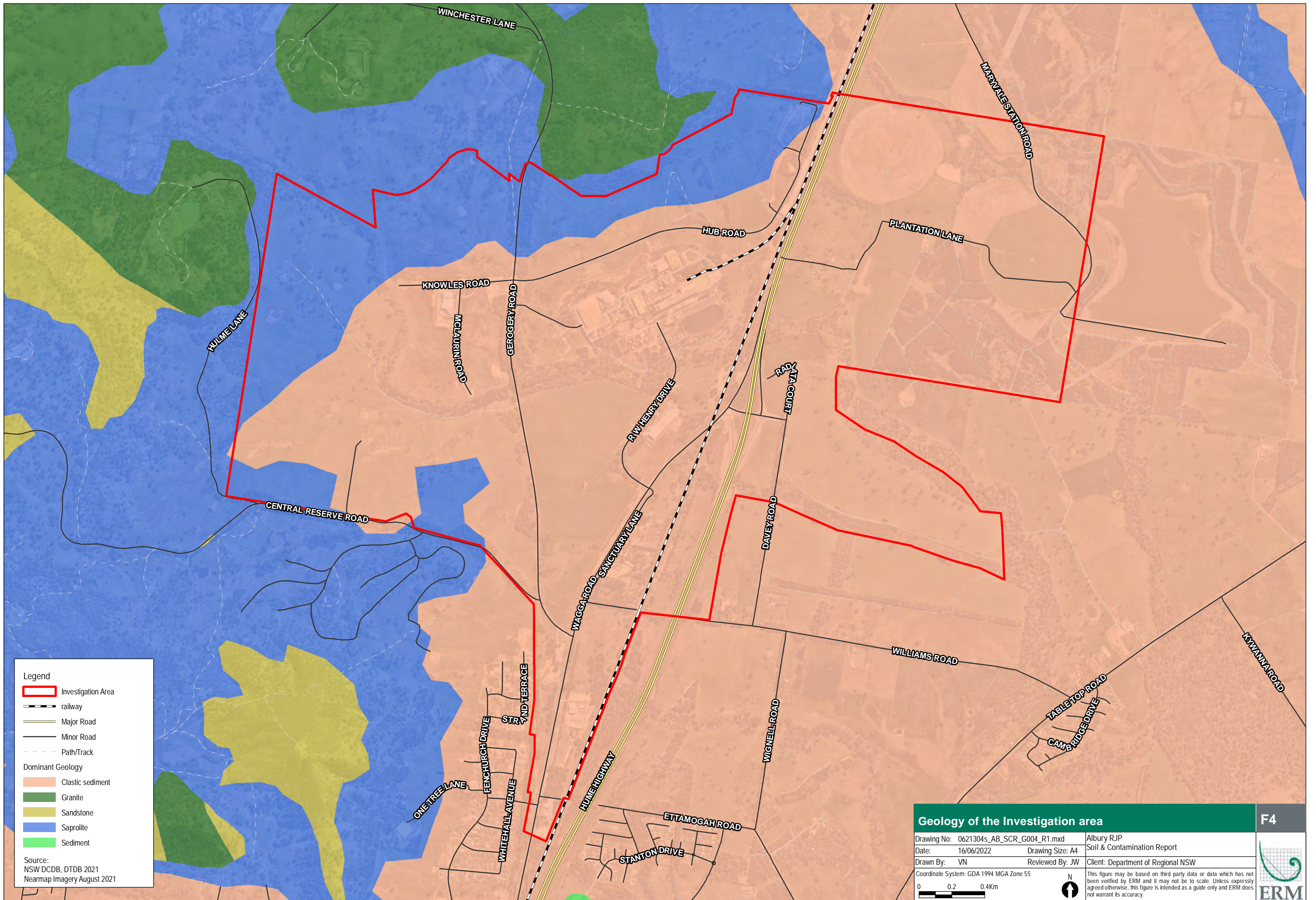
- Investigation Area
- railway
- Major Road
- Minor Road
- Path/Track

Dominant ASC - Order

- Chromosols (CH)
- Kandosols (KA)
- Kurosols (KU)
- Rudosols (RU)
- Sodosols (SO)

Source:
NSW DCDB, DTDB 2021
Nearmap Imagery August 2021

Soils of the Investigation Area		F3
Drawing No: 0621304s_AB_SCR_G003_R1.mxd	Albury RJP	
Date: 16/06/2022	Drawing Size: A4	Soil & Contamination Report
Drawn By: VN	Reviewed By: JW	Client: Department of Regional NSW
Coordinate System: GDA 1994 MGA Zone 55		
<small>This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.</small>		



Legend

- Investigation Area
- railway
- Major Road
- Minor Road
- Path/Track
- Dominant Geology**
- Clastic sediment
- Granite
- Sandstone
- Saprolite
- Sediment

Source:
NSW DCDB, DTDB 2021
Nearmap Imagery August 2021

Geology of the Investigation area		F4
Drawing No: 0621304s_AB_SCR_G004_R1.mxd	Albury RJP	
Date: 16/06/2022	Drawing Size: A4	
Drawn By: VN	Reviewed By: JW	Client: Department of Regional NSW
Coordinate System: GDA 1994 MGA Zone 55		This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.

4. PREVIOUS INVESTIGATIONS

At the time of preparation of this Report, limited existing reports in relation to soils and contamination were available, however some of the existing planning submissions available do provide commentary around site contamination issues. In addition – during fieldworks undertaken at the Visy Albury Paper Mill, additional reporting and data was made available for review by ERM and this has been summarised below.

4.1 Planning Report and SoEE Blueprint Planning 2020

Blueprint Planning prepared a Planning Report and Statement of Environmental Effects for an Industrial factory, warehouse and office – Plastic recycling facility at the corner of Knowles Road and McLaurin Road, Ettamogah NSW. This report noted that:

Previous investigations of the Site and adjoining land carried out as a part of Development Application numbers 10.2015.34157.1 and 10.2019.36877.1 revealed that the Site has no potential land contamination issues, and therefore no land contamination investigations have been carried out as a part of this DA

4.2 Visy Albury Paper Mill – Soil Monitoring for Licence Compliance

The Visy Albury Paper Mill undertakes routine soil monitoring as required by the NSW EPA Environmental Protection Licence (EPL) No. 1272.

A copy of a letter prepared by McMahon Earth Science on behalf of Visy Albury Pty Ltd (dated 16 December 2021) was provided to ERM for review in preparation of this Technical Report. Treated effluent from the paper mill has been used to irrigated tree plantations since 1995 and crops and pastures since 2003 (McMahon, 2021) in accordance with Visy's EPL No. 1272 which includes a condition requiring routine soil monitoring. Soil samples are collected and analysed for chemical physical testing including pH, electrical conductivity, extractable sulfate, exchangeable cations and Emerson aggregate stability.

The McMahon letter (2021) concluded that the irrigation of plantations and crops and pastures with treated effluent from the paper mill was performing within the expected parameters for both hydraulic and nutrient load. The longer term trends indicate that variations in pH, salinity, sodicity and sulfate are relatively minor, with some seasonal variations which may be attributed to the changes in wastewater quality and the decreased need for irrigation in 2021 due to above average rainfall in the catchment. The soil analysis indicates that the crop and pasture areas on the footslopes are characterised by soils of the yellow sodosols subtype which are poorly drained and therefore have higher sodicity and salinity. The levels of soil salinity remain below the Load Based Licencing threshold of 4.0 dS/m.

4.3 Visy Albury Paper Mill (Norske Skog Pty Ltd) – Statement of Environmental Effects - Section 92(2) Modification of Consent for Wastewater Management

A Statement of Environmental Effects (SoEE) was submitted as part of an application under Section 92(2) of the EP&A Act for modification of consent for wastewater management by Norske Skog Pty Ltd in 2008. The proposed modification relates to the proposed modification to discharge treated wastewater to the Murray River at Albury, with a proposal to offset salinity impacts by funding of the operation and maintenance of the existing licensed scheme Billabong Creek Salt Interception Scheme (BCSIS), which operates down-stream at Walla Walla.

The content of the SoEE primarily describes potential environmental impacts from the discharge of treated wastewater to the surface water of the Murray River, which is not directly relevant to this report, however the following section summarises key background information that may be relevant.

The SoEE includes the following information which may be relevant to the understanding of the use of treated wastewater associated with the operations at the Visy Paper Mill:

- Wastewater produced at the Mill is treated to remove organic matter, particulates and nutrients and the treated wastewater has been assessed. The primary contaminants of concern in treated wastewater are inorganic salts, nitrogen, phosphorus, particulates (total dissolved solids), metals and chelating agents;
- A water quality assessment concluded that there would be “negligible” impacts from discharge of low concentrations of contaminants in the treated wastewater; and
- An ecological toxicity assessment (including ecotoxicological tests on aquatic species) concluded that “there were no detrimental impacts on a range of different species at any concentration of wastewater”.

The SoEE includes the following information which may be relevant to the understanding of salinity impacts associated with the operations at the Visy Paper Mill:

- The modification will result in lower volumes of treated wastewater being used for irrigation of forestry lands; and
- A condition was added to the consent requiring preparation and implementation of a soil and groundwater monitoring and management plan to ensure the soil salinity and sodicity conditions within the irrigation area is managed appropriately. (An example of recent monitoring for compliance with these conditions is summarised in Section 4.2 above).

The SoEE includes the following information which may be relevant to the understanding of contamination associated with the operations at the Visy Paper Mill:

- The Albury Mill includes the following key processes:
 - Log storage, handling and preparation
 - Thermo-mechanical pulp (TMP)
 - Recycled fibre (RCF)
 - Paper machine (PM)
 - Warehouse and Distribution
 - Water and wastewater treatment plant (WWTP)
 - Pulp Dewatering Facility (PDF)
- The following chemicals were stored and used (in 2008):
 - Sodium hydroxide (Pulping of RCF)
 - Sodium silicate (Pulping of RCF)
 - Hydrogen peroxide (Bleaching of RCF)
 - DTPA (Pulping of RCF)
 - Sulfuric acid (pH control on PM)
 - Sodium hydroxide (Headbox cleaning PM)
 - Alum (Water treatment)
 - Urea (Nutrient for activated sludge in WWTP)
 - Soap (Ink flotation in RCF)
 - Sodium hydrosulfite (Brightening of TMP)
 - Phosphoric acid (Nutrient for activated sludge in WWTP)

- Slimicides (Anti-slime agents in TMP and PM)
- Dyes (Shade control in PM)
- Chlorine (Sterilisation in water Treatment)
- Retention chemicals (Fibre retention on PM)
- Bentonite (Internal water clarification)
- Polymer (Water clarification and sludge treatment)
- Lime (pH control in WWTP)
- Cleaning solvents (Various)

4.4 Albury Local Environment Plan (ALEP) 2010

Land contamination was considered in the development of the Albury Local Environment Plan (ALEP) 2010 which references analysis of zoning change impacts on land capability undertaken in the Albury Local Environmental Study 2008 (November 2008). The Albury Local Environmental Study 2008 recommended that further investigation of land contamination be considered for the Part Ettamogah Industrial Hub (East of the Old Hume Highway) prior to development activities given the irrigation of part of the land with effluent from the water dam at the adjacent Norske Skog (now Visy) Paper Mill. The proposed rezoning was “*deferred pending further geotechnical assessment to determine capability of the subject land to accommodate industrial land use activities without having a degrading effect on potential water supplies, groundwater systems and/ or salinity levels*” (page 63, Albury Local Environment Study 2008).

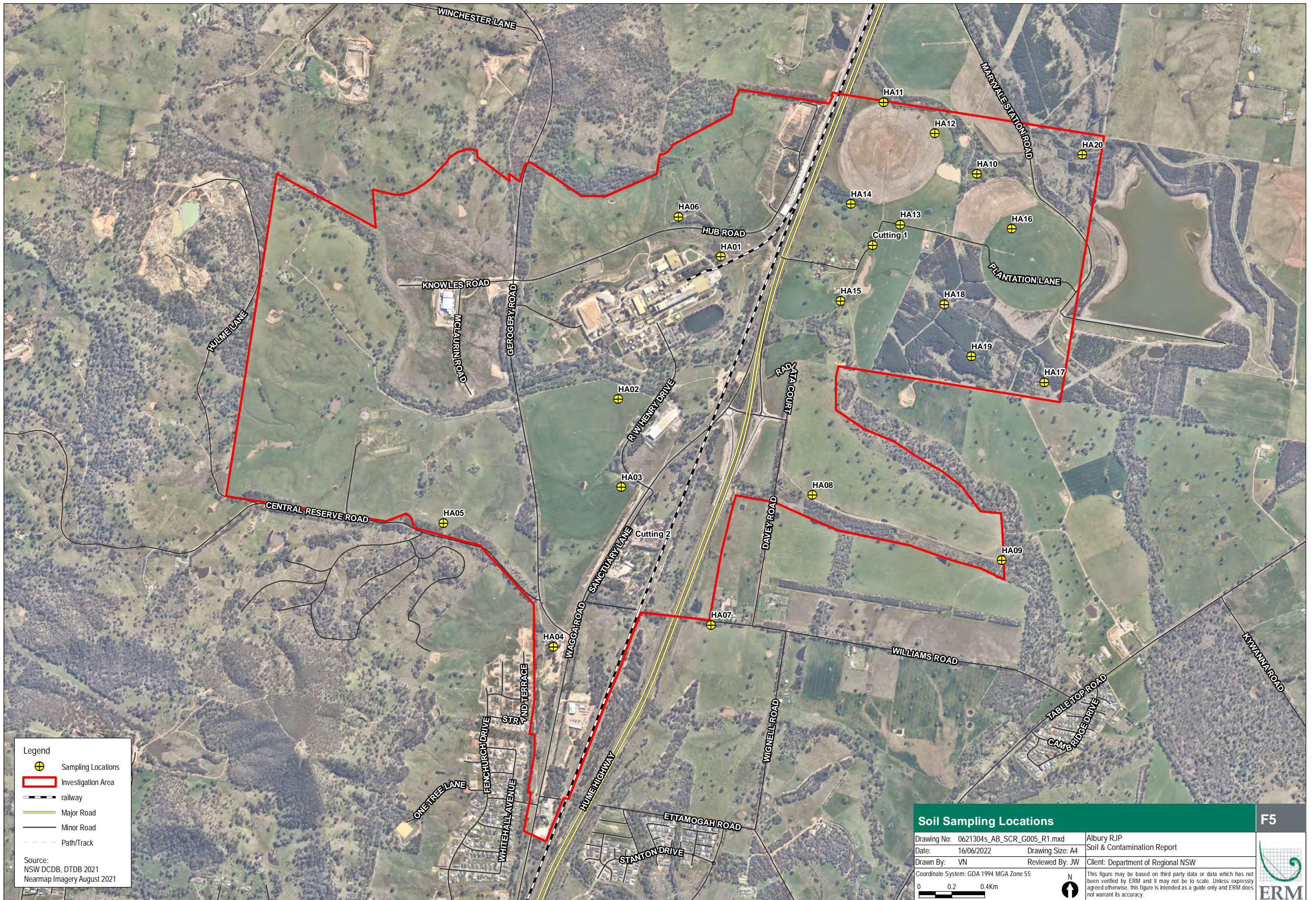
5. SITE INSPECTION

A site inspection was undertaken by an ERM Environmental Scientist concurrent with the targeted soil sampling works on 2 March 2022. In addition, observations made by other ERM consultants during heritage fieldworks have also been summarised herein. It is noted that given the scale of the site and access constraints (primarily associated with prolonged wet weather in the period leading up to the inspection) not all areas of the site were inspected, however a sufficiently broad overview of potential AECs and other contamination issues was gathered to inform this assessment.

In addition to the current and former industrial site uses identified in the PSI and described in further detail in Section 7, the key observations made in relation to potential areas of contamination included:

- 2 x isolated piles of demolition waste associated with historic buildings / structures (refer photographs 1 to 5 of Appendix C and Figure 8);
- Informal waste dump on Model Aero Club site (refer photographs 6 and 7 of Appendix C and Figure 8); and
- Illegal dumping observed on / adjacent to Davey Road / Radiata Court intersection (refer to location on Figure 8).

Soil samples were collected at 20 locations to support the preliminary assessment of salinity and acid sulfate soils across the site. The soil sampling locations are shown in Figure 5, and further details on sampling are presented in Section 6.



Legend

- Sampling Locations
- Investigation Area
- railway
- Major Road
- Minor Road
- Path/Track

Source:
NSW DCDB, DTDB 2021
Nearmap Imagery August 2021

Soil Sampling Locations		F5
Drawing No: 0621304s_AB_SCR_G005_R1.mxd	Albury RJP	
Date: 16/06/2022	Drawing Size: A4	Soil & Contamination Report
Drawn By: VN	Reviewed By: JW	Client: Department of Regional NSW
Coordinate System: GDA 1994 MGA Zone 55		
<small>This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.</small>		

6. PRELIMINARY SOIL ASSESSMENT

6.1 Soil Landscapes

Soils within the site are broadly classified as sodosols throughout the majority of the site, with a pocket of kurosols along the south western boundary of the site. Available mapping from NSW DPE eSPADE tool ([eSPADE v2.1 \(nsw.gov.au\)](https://www.nsw.gov.au/eSPADE)) indicates that one soil landscape is present on the site, being the Ettamogah residual soil landscape.

The Ettamogah landscape consist of:

- **Landscape:** 71.1 km² undulating plain on Silurian volcanics. Local relief 40–60 m; altitude 200–300 m; slopes 0–9%. Undulating low hills and rises with rounded crests and long gently inclined footslopes. Slopes are gentle and waxing. Drainage lines are widely spaced and poorly defined. Extensively cleared white box woodland.
- **Soils:** Deep (1.0–1.5 m), well-drained Red Chromosols and Kurosols (Red Podzolic Soils) occur on crests, with deep (1.0–1.5 m), moderately well-drained Yellow Chromosols (Yellow Podzolic Soils) on slopes. Footslopes and drainage lines consist of deep (1.0–1.5 m), poorly drained Yellow Sodosols (Brown and Yellow Soloths and Solodic Soils).
- **Limitations:** high gully erosion risk; localised sodicity; localised poor drainage; seasonal waterlogging; moderate sheet erosion risk; localised ferromanganic and cultivation hardpans; potential discharge area; localised foundation hazard.

ERM note that the NSW DPE mapping of soil landscapes terminates within the eastern portion of the site.

6.2 Salinity and Soil Aggressivity

6.2.1 Desktop Review

Based on regional soil mapping, the soil salinity hazards within the site are classed as low and high risk as shown in Figure 6 (as per Map 1.4a provided in Appendix A). The areas of high salinity hazard are located in the central and eastern areas of the RJP, with low salinity hazard present in the western part of the RJP.

Soil landscapes within the investigation area are subject to localised salinity and may represent aggressive soils and foundation hazards. Soil sampling and laboratory analysis was undertaken to provide a preliminary assessment of these hazards within the RJP and is discussed further in the following sections.

6.2.2 Soil Sampling and Analysis

The sampling design, methodology and assessment criteria applied in this investigation are sourced from the following Australian guidelines:

- Australian Standard 2159-2009 Piling – Design and Installation (AS 2159-2009)
- Department of Land and Water Conservation (2002), Site Investigation for Urban Salinity

ERM undertook further assessment including a site inspection and preliminary sampling on 2 March 2022. The soil sampling locations are shown on Figure 6. Soil sampling locations were targeted to areas of higher salinity risk as indicated in the desktop assessment (Section 6.2.1) to provide a preliminary assessment of salinity.

Soil samples were collected to a maximum depth of 0.5m below ground level (bgl) and soils were characterised as silt, clayey silt or silty clay. During the fieldworks, ERM did not observe any visual indicators of salinity such as bare earth, die back of vegetation or salt crystals on the ground surface.

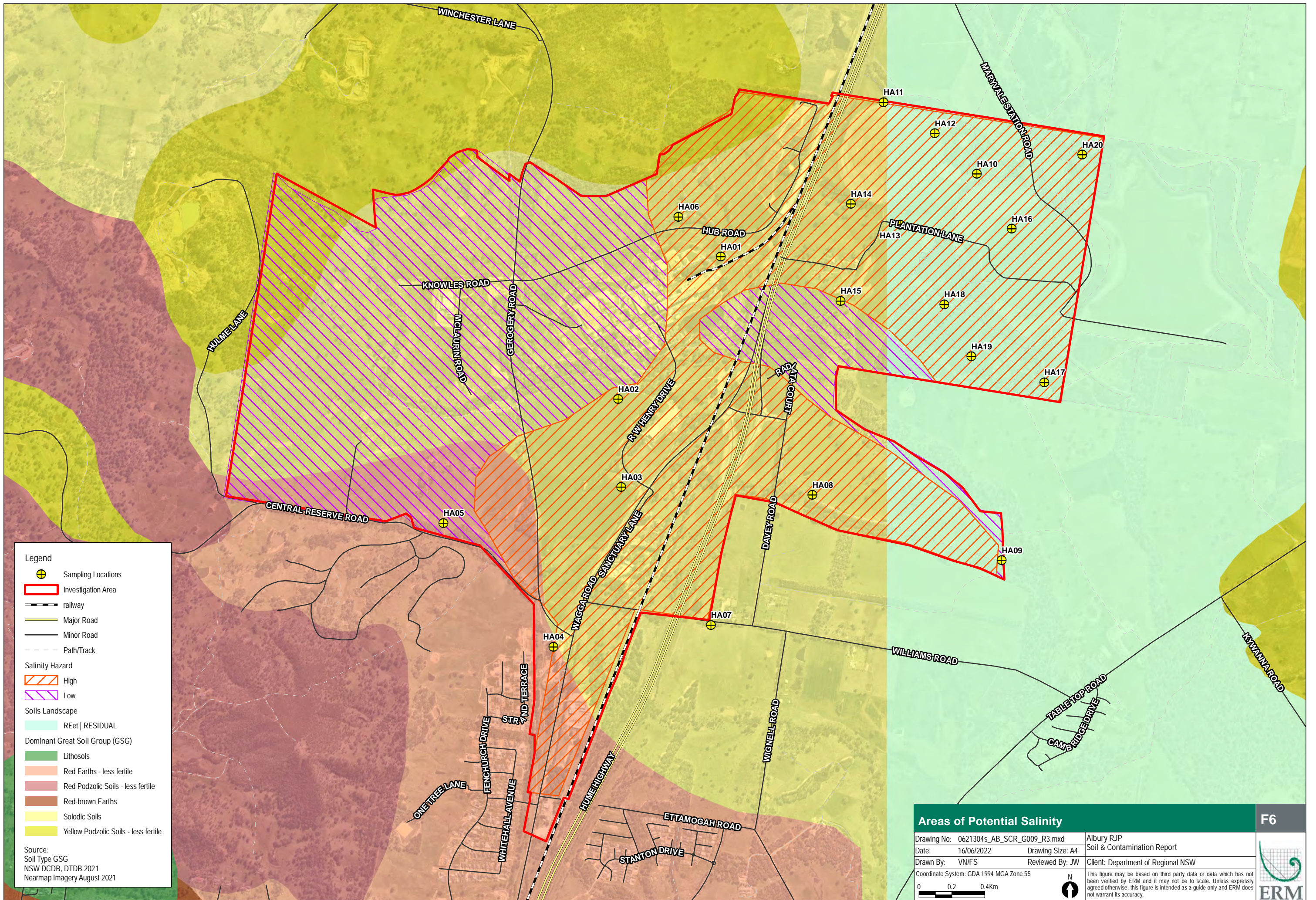
Sampling locations are presented on Figure 8 and associated sampling logs and field notes within Appendix D, relevant photographs are presented in Appendix C.

In total 22 samples (20 primary and two field duplicates) were submitted for analysis. Analytical results are presented in Table 4 of Appendix B with laboratory certificates of analysis presented in Appendix E.

6.2.3 Results

The laboratory analytical results with comparison to the applicable assessment criteria are presented in Tables 1 to 3 in Appendix B for salinity, sodicity, aggressivity and CEC. In summary, the laboratory results indicate the following:

- Salinity - All 20 soil samples reported salinity parameters (electrical conductivity as ECe) which indicate surface soils are non-saline, with negligible salinity effects on crops to be expected;
- Sodicity - Sodicity ranged from non-sodic to highly sodic across the RJP, with 3 samples reporting highly sodic conditions (HA09, HA16 and HA19 on the eastern upper slopes), 6 samples reporting sodic conditions (HA01, HA03, HA10, HA15, HA17 and HA18) and 11 samples reporting non-sodic conditions;
- Cation exchange capacity (CEC) – CEC ranged from very low to moderate, with 8 samples reporting very low CEC, 7 samples reporting low CEC and 5 samples reporting moderate CEC; and
- Aggressivity:
 - All 20 soil samples reported chloride and pH concentrations indicative as non-aggressive to steel;
 - 18 soil samples reported sulfate and pH concentrations indicative as non-aggressive to concrete; and
 - 2 soil samples (HA07 and HA20) reported sulfate and pH concentrations indicative as mildly aggressive to concrete based on pH values <5.5.



6.3 Acid Sulfate Soils

6.3.1 Desktop Review

Whilst acid sulfate soils (ASS) are commonly associated with coastal and estuarine environments, inland acid sulfate soils may occur on and surrounding inland waterways, wetlands and drainage channels (NSW EPA, 2022). Acid Sulfate Soils are defined within the Albury Local Environmental Plan (LEP) 2010 as: naturally occurring sediments and soils containing iron sulfides (principally pyrite) or their precursors or oxidation products, whose exposure to oxygen leads to the generation of sulfuric acid (for example, by drainage or excavation). ASS generally develop in waterlogged, saline and anaerobic conditions. It is noted that the Murray–Darling Basin Authority Acid Sulfate Soil Risk Assessment Project confirmed that the highest concentration of inland ASS within NSW is along the Murray River and its floodplains, from Albury to near the South Australian border (EPHC, 2011). As shown on Figure 7, the available mapping (sourced from Map 1.4b - Appendix A) indicates that there is a high probability of acid sulfate soils being present on the majority of the site, with an extremely low probability present on the western slopes of the site.

6.3.2 Soil Sampling and Analysis

ERM undertook a preliminary field assessment including a site inspection and limited sampling of soils within the mapped areas of high probability. A total of 21 primary soil samples were collected from 20 locations by an ERM environmental scientist on 2 March 2022 using a hand auger. The sample locations are shown on Figure 7. The sample locations were co-located with the salinity and soil aggressivity sample locations and sought to assess a range of landform and soil types present across the investigation area. Following collection, samples were transferred to appropriate laboratory supplied zip lock bags and chilled prior to immediate dispatch to the analytical laboratory for analysis. Samples were analysed by Eurofins Environment Testing (Eurofins - a NATA accredited laboratory) for the Chromium Reducible Sulfur (CRS) suite.

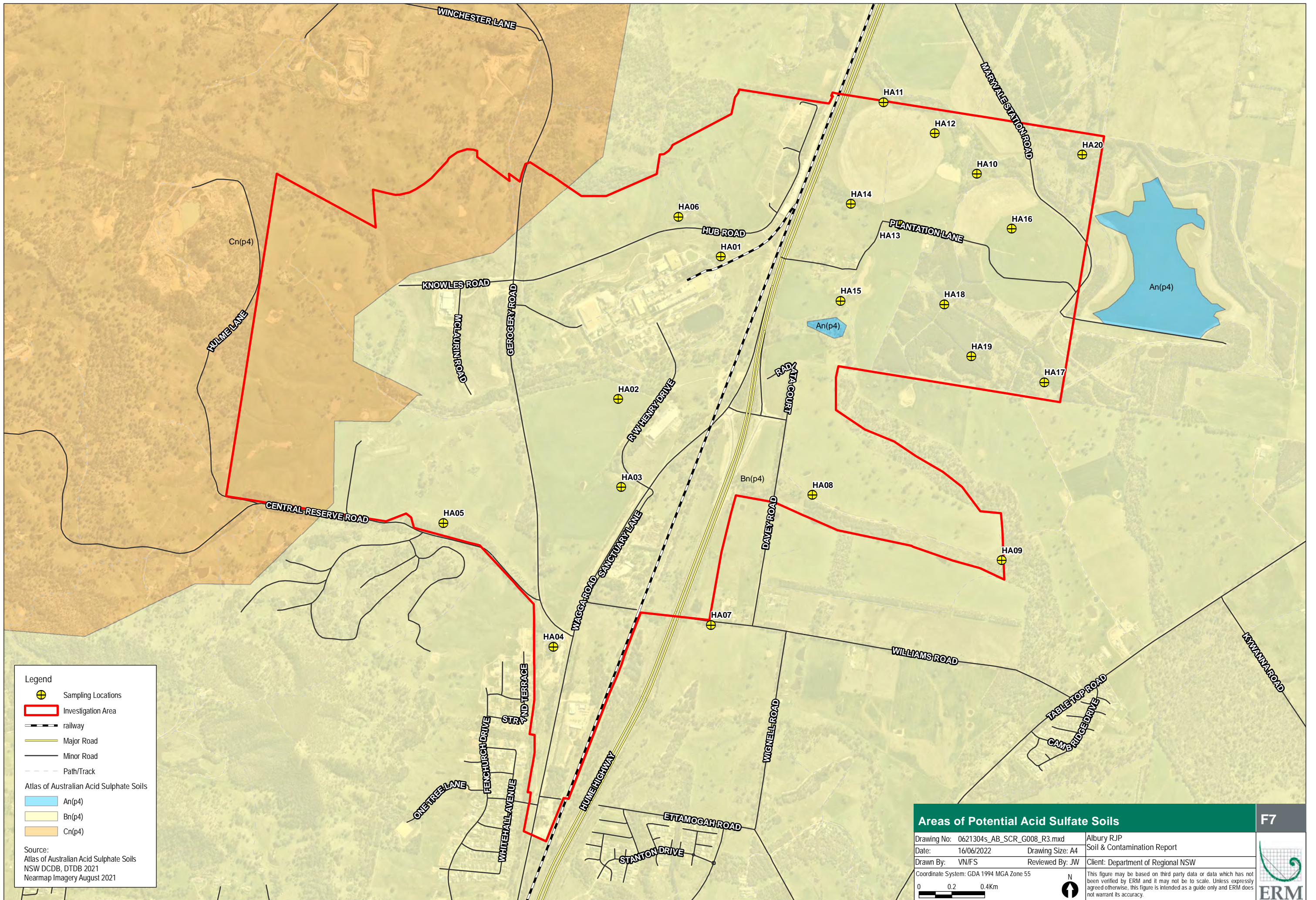
6.3.2.1 Sub-surface conditions and Field Observations

Soil samples were collected to a maximum depth of 0.5 m below ground level (bgl) and the sampled soils were generally characterised as silt, clayey silt or silty clay. During the fieldworks, ERM did not observe any visual indicators of actual acid sulfate soils such as vegetation die off, scalds, deposits of coppery coloured scum on waterways or jarosite. Sampling locations are presented on Figure 8 and associated sampling logs and field notes within Appendix D, relevant photographs are presented in Appendix C.

6.3.2.2 Laboratory analysis

In total 23 samples (21 primary and two field duplicates) were submitted for analysis. Analytical results are presented in Table 4 of Appendix B with laboratory certificates of analysis presented in Appendix E. As presented in the summary tables, it is noted that samples collected from locations HA01, HA05, HA07, HA09 and HA15 exceeded one or both of the adopted ASSMAC (1998) screening values which would generally indicate that further detailed assessment is required.

In reviewing the analytical results obtained it is noted that whilst sediments with a net acidity of more than 18 moles of H⁺/t normally trigger the requirement for detailed ASS assessment, this is generally only required where that acidity is sulfide-related acidity (EPHC, 2011). It is noted that, following additional analysis, the two samples with the highest reported Net Acidity values (HA01 and HA07) both returned results for Potential Acidity (Chromium Reducible Sulfur) and Extractable Sulfur below the laboratory's limit of reporting (LOR). This, along with the low (~4.5 pH) actual acidity values reported for these samples indicates that whilst these sample are representative of acidic soils (refer also to discussion of soil aggressivity results), they are unlikely to be indicative of ASS. This assessment of the analytical results was further confirmed by ERM via discussions with Eurofins National Acid Sulfate Soils Specialist (Myles Clark).



Legend

- Sampling Locations
- Investigation Area
- railway
- Major Road
- Minor Road
- Path/Track

Atlas of Australian Acid Sulphate Soils

- An(p4)
- Bn(p4)
- Cn(p4)

Source:
 Atlas of Australian Acid Sulphate Soils
 NSW DCDB, DTDB 2021
 Nearmap Imagery August 2021

Areas of Potential Acid Sulfate Soils		F7
Drawing No: 0621304s_AB_SCR_G008_R3.mxd	Albury RJP	
Date: 16/06/2022	Soil & Contamination Report	
Drawn By: VN/FS	Reviewed By: JW	Client: Department of Regional NSW
Coordinate System: GDA 1994 MGA Zone 55		<p>This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.</p>
<p>0 0.2 0.4Km</p>		

7. PRELIMINARY CONTAMINATION ASSESSMENT

7.1 Site History

7.1.1 Aerial Photographs

Historical aerial photographs (**Appendix A**) were reviewed to assess potential historical land use practices undertaken within and surrounding the site. A summary of information obtained from the review is presented within the table below.

Year	Description
1961 – Black & White	<ul style="list-style-type: none"> ■ Site Area: The site consists of agricultural land with associated farm house and undeveloped land. Main southern Railway and the Hume Highway are present on site in their positions as per time of writing. ■ Surrounding Area: The surrounding area is primarily comprised of agricultural land and undeveloped land. The Ettamogah ammunition depot is present off the south west boundary of the site.
1987 – Black & White	<ul style="list-style-type: none"> ■ Site Area: The majority of the site remains agricultural and undeveloped land. The paper mill has been constructed in the central portion of site and has a similar foot print as present day. ■ Surrounding Area: Minor residential development has occurred with several houses observed to the south of the site. Some quarrying activity occurring to the north of site.
1996 – Colour	<ul style="list-style-type: none"> ■ Site Area: The metal forging facility can be seen to the south of the paper mill. The remainder of the site area appears unchanged from previous aerial photography. ■ Surrounding Area: Ettamogah forest dam has been constructed/filled and can be seen on the eastern boundary of the site.
1998 – Colour	<ul style="list-style-type: none"> ■ Site Area: No significant changes were observed for the site since previous aerial photography. ■ Surrounding Area: No significant changes were observed for the land surrounding the site since previous aerial photography.
2003 – Colour	<ul style="list-style-type: none"> ■ Site Area: A small runway and associated buildings has been constructed in south west portion of the site as part of the model airplane club. ■ Surrounding Area: No significant changes were observed for the land surrounding the site since previous aerial photography.
2010 – Colour	<ul style="list-style-type: none"> ■ Site Area: The Ettamogah rail hub has now been constructed to the north east of the paper mill. ■ Surrounding Area: Further individual residential dwellings have been constructed to the north and south of the site.
2015 – Colour	<ul style="list-style-type: none"> ■ Site Area: No significant changes were observed for the site since previous aerial photography. ■ Surrounding Area: Further residential/light commercial development has occurred to the south of the site.
2018 – Colour	<ul style="list-style-type: none"> ■ Site Area: Further roads have been constructed to the west of the paper mill to service the NEXUS Industrial Precinct. ■ Surrounding Area: No significant changes were observed since previous aerial photography.
2021 – Colour	<ul style="list-style-type: none"> ■ Site Area: A new industrial facility has been constructed to the west of the paper mill as part of the NEXUS Precinct. ■ Surrounding Area: No significant changes were observed since previous aerial photography.

7.1.2 Historical Potentially Contaminating Business Records

A search of historical potentially contaminating business records and land titles for the site and surrounding area (200 m radius) was undertaken from the 1930s to date. The results of the search are summarised below, and a copy of historical business records is provided within **Appendix A**.

Period	Registered Business Types
1930's	<ul style="list-style-type: none"> ■ No Records
1940's	<ul style="list-style-type: none"> ■ No Records
1950's	<ul style="list-style-type: none"> ■ No Records
1960's	<ul style="list-style-type: none"> ■ No Records
1970's	<ul style="list-style-type: none"> ■ No Records
1980's	<ul style="list-style-type: none"> ■ No Records
1990's	<ul style="list-style-type: none"> ■ Earth Moving and/or Excavating Contractors (south of site)
2000's	<ul style="list-style-type: none"> ■ Forgings (onsite) ■ Kitchen renovations and equipment – New (south of site) ■ Gas appliances and equipment (south of site) ■ Hot water systems sales installations and repairs (south of site) ■ Plumbers and gasfitters (south of site) ■ Graziers (south of site)
2010's	<ul style="list-style-type: none"> ■ Building contractors – Renovations, alterations and extensions (south of site) ■ Engineers – Motors and repairers (onsite) ■ Paper Merchants (onsite) ■ Carriers – Heavy industrial transport (onsite) ■ Cabinetry makers (onsite) ■ Zoos animal parks and sanctuaries (onsite)

7.2 Potentially Contaminating Activities

A search of past and present potentially contaminating activities are detailed within the following sections. Figures illustrating the location of identified activities are detailed within **Appendix A**.

7.2.1 NSW EPA Contaminated Land Search

A search of the NSW EPA contaminated land database under the *Contaminated Land Management (CLM) Act 1997* (NSW) undertaken for the site and a 1 km buffer area indicated no sites have been notified to NSW EPA.

7.2.2 NSW EPA Contaminated Lands Records of Notice

A search of the NSW EPA Contaminated Land Records of Notice database was undertaken for the site and 1 km buffer area indicates there are no Contaminated Land Records of Notice.

7.2.3 NSW EPA PFAS Investigation Program

A search of the NSW EPA PFAS investigation program database indicated that no PFAS investigations had been or were being undertaken at the site or within the 2 km report buffer area.

7.2.4 National Pollutant Inventory Industrial Facilities

A search of the National Pollutant Inventory (NPI) register indicated the following sites to be located within the 500 m search buffer area:

Facility Name	Address	Primary ANZSIC Class	Latest Report	Distance from Site (m)	Direction
Norske Skog Albury Papermill	117 RW Henry Drive, Ettamogah	Pulp, Paper and Paperboard Manufacturing	2018/2019	0.0	Onsite
Overall Forge	70 RW Henry Drive, Ettamogah	Iron and Steel Forging	2018/2019	0.0	Onsite

7.2.5 Licencing under the POEO Act 1997

A search of the NSW EPA record of licensed activities under the *Protection of the Environment Operations Act 1997* (NSW) undertaken for the site and 500 m buffer area identified the following sites:

Licence Holder	EPL Number	Location Name	Premise Address	Fee Based Activity	Distance to Site	Direction
Circular Plastics Australia (PET) Pty Ltd	21519	Circular Plastics Australia (PET) Pty Ltd Corner of Knowles Road and McLaurin Road, Ettamogah, NSW, 2640	Circular Plastics Australia (PET) Pty Ltd Corner of Knowles Road and McLaurin Road, Ettamogah, NSW, 2640	Waste Storage – other types of waste Chemical storage waste generation Recovery of general waste	0.0	Onsite
VISY Albury Pty Ltd	1272	Maryvale and Rosedale	Maryvale and Rosedale, Ettamogah	Dangerous goods production Paper or pulp production	0.0	Onsite

Licence Holder	EPL Number	Location Name	Premise Address	Fee Based Activity	Distance to Site	Direction
AP Delaney & Co Pty Ltd	10069	Winchester Lane	Winchester Lane, Table Top	Crushing, grinding or separating Extractive activities Waste disposal by application to land	0	Onsite
Burgess Earth Moving Pty Ltd	1954	Olympic Way – Ettamogah Via	Olympic Way – Ettamogah Via, Albury	Crushing, grinding or Separating Extractive activities	0 (adjacent)	West
Burgess Earth Moving Pty Ltd	13233	Olympic Way	Olympic Way, Wagga Wagga	Extractive activities	0 (adjacent)	West

7.2.6 *Delicensed Premises still Regulated by EPA, Licences Surrendered, Clean Up and Penalty Notices*

A search of the NSW EPA record of licensed activities under the *Protection of the Environment Operations Act 1997* (NSW) undertaken for the site and a 1 km buffer area identified the following sites:

Licence No	Licence Holder	Location Name	Premise Address	Fee Based Activity	Status	Distance (m)	Direction
13419	Forestry Corporation of NSW Trading as: Forestry Corporation	IFOA Area "South-Western Cypress Region"	State Forest and other Crown-timber lands within the south-western area, Dubbo, NSW, 2830	Logging operations	No longer in force	0.0	Not mapped

It is noted that during the inception meeting for the Albury RJP project, anecdotal information that water from the Ettamogah Forest Dam was used for irrigation of timber plantations was discussed. It was noted that the waters may have had elevated salinity which may have had some impact on these areas. A copy of a report was provided by Visy on soil monitoring for the EPL conditions and a summary is provided in Section 4.2 of this report.

This issue was investigated further during the field investigations with soil sampling at locations HA10, HA11, HA12, HA14, HA16, HA17, HA18, HA19, HA20 (see Section 8.2 for discussion of salinity sampling results).

7.2.7 *Clean up and Penalty Notices*

A search for sites issued with clean up or penalty notices within the Site and surrounding area 500m buffer area identified the following:

Location ID	Notice Type	Notice Number	Licence Holder	Location Name	Distance (m)	Direction
290	Penalty Notice	1518944	Burgess Earth Moving Pty Ltd	Extractive activities	0 (adjacent)	West

7.2.8 Defence / UXO Sites

A search of Department of Defence databases identify the following Defence or UXO impacted sites within the Site or surrounding 2 km buffer area:

Site name	Type	Details	Distance (m)	Direction
Ettamogah	Unexploded Ordnance (UXO)	Potential presence of UXO = Substantial Potential This site was part of an Ammunition Depot from WWII to 1982. [Source: Department of Defence Australian Government] The former military installation of RAAF Ettamogah was located in Ettamogah along Central Reserve Road off the Olympic Way at One Tree Hill. In 1926, the surrounding farms were purchased by the Australian Defence Department for development into an airfield and military installations. During 1942, an ammunition depot was established by the Royal Australian Air Force (RAAF) on 110 hectare area at Ettamogah. Operated by the RAAF. In 1961, handed over to the Australian Army's 311 Supply Company. In 1982, the ordnance depot was closed with all munitions removed by 1990.	5	South-east
Tabletop	Unexploded Ordnance (UXO)	Potential presence of UXO = Slight Potential This site was used as an Artillery Range during WWII. [Source: Department of Defence Australian Government].	1390	North-east

7.2.9 Historical Landfills

A search for former potentially contaminating activities undertaken for the site and 500 m buffer area identified no current or former landfills.

7.2.10 Other Current Potentially Contaminating Activities

A search of other current potentially contaminating activities undertaken for the site and 500 m buffer area identified the following sites:

Site Name	Category	Location	Status	Distance (m)	Direction
Australian News Print Mills	Substations/ Switching Stations	Ettamogah, NSW	Operational	0	Onsite
Burgess Quarry	Operating Mines	Olympic Way, Wagga Wagga, NSW, 2650	Operational	0 (adjacent)	Onsite

7.2.11 Search of Potentially Contaminating Activities

A search for potentially contaminating activities undertaken for the site and 200 m buffer area identified the following sites:

Site Name	Category	Location	Status	Distance (m)	Direction
Visy	Manufacturing	117 RW Henry Drive, Ettamogah NSW 2640	Operational	0.0	Onsite
Overall Forge	Steel Distributor	70 RW Henry Drive, Ettamogah NSW 2640	Operational	0.0	Onsite
Rod's Chassis Repairs Pty Ltd	Truck repair shop	Henshaw Ct, Springdale Heights NSW 2641	Operational	50	South

7.2.12 Derelict Mines and Quarries

A search for potential derelict mines and quarries on site and within a 500m buffer area identified the following sites:

Site Name	Description	Distance (m)	Direction
Ettamogah/ Potential Brick Clay Resource	Locality 10 in GS1974/021 based on data from P Evans who undertook exploration under EIs for Albury Brickworks. Data from GS1974/190 (exploration reported for EIs 652, 653) is very sparse suggesting locations in GS1974/021 were provided directly by P Evans.	0	Onsite
Potential Clay/Shale resource	Potential clay/shale resource 19 (lesser quality) identified by P Evans of Albrick P/L (GS1974/190, GS1974/021)	0	Onsite
Gun Club Put/Olympic Way (Rockwood 3)/Nine Mile Hill	Granite Extraction of 12,300 m ³ over 42 months from 18/6/99 to 18/12/02 by McGeoch & Stitz. Information supplied by Albury Council.	0	Onsite
Wards Pit/Central Reserve Road, Ettamogah	Mainly granite, basalt from veins only. Land owned by Albury-Wadonga Development Corporation. Development consent granted 7/9/95, resissued in 1/8/90 for an unspecified period. 113,000 m ³ /pa limit on production. No production recorded since 1993-94.	10	West
Unnamed Pit	DMR proposed pit (in 1974) for road materials (GS1974/021).	280	South-west

7.3 Summary of Desktop Review

The results of the preliminary site investigation (PSI) indicated the following:

- The site is located in an area comprising primarily industrial and agricultural land uses.
- The site is underlain by two alluvial geological formations from the quaternary period. Soil landscapes within the Site were described as including the Ettamogah Residual soil landscape.
- ERM notes that the majority of the soil landscapes within the investigation area are subject to localised salinity and may represent aggressive soils and foundation hazards. It is recommended that further assessment of soil salinity is undertaken including a site inspection and sample collection and analysis.
- Available mapping indicates that there is a high probability of acid sulfate soils being present on much of the site with a much lower probability on the western slopes.
- Further assessment including completion of a site inspection and targeted preliminary sampling for both salinity and acid sulfate soils is proposed during the next phase of the assessment to better understand the nature and extent of any constraints to future development associated with these issues.
- Groundwater within the site and surrounding area was measured (or found?) to be present within underlying aquifers at depths ranging from 1.0 – 47.3 mbgl. Groundwater bores within the Site and surrounding area were identified to be utilised for a range of uses including monitoring and domestic water supply.
- Surface water receptors consisted of Eight Mile Creek as well as several surface water dams located throughout the Site. During periods of rainfall it is the opinion of ERM that surface waters would infiltrate the site surface or flow via overland flow paths / ephemeral drainage lines to the creek and onsite dams and / or adjacent surface water receiving bodies such as Ettamogah Forest Dam located to the east of site.
- The site and surrounding area has been primarily agricultural land since the earliest aerial photography records (1961). ERM notes that a range of commercial / industrial land uses have been undertaken within the site and surrounding area however, with some exceptions (e.g., the former Ettamogah Army Stores Depot), specific details on the nature of these operations is largely unknown.

7.4 RJP Conceptual Site Model

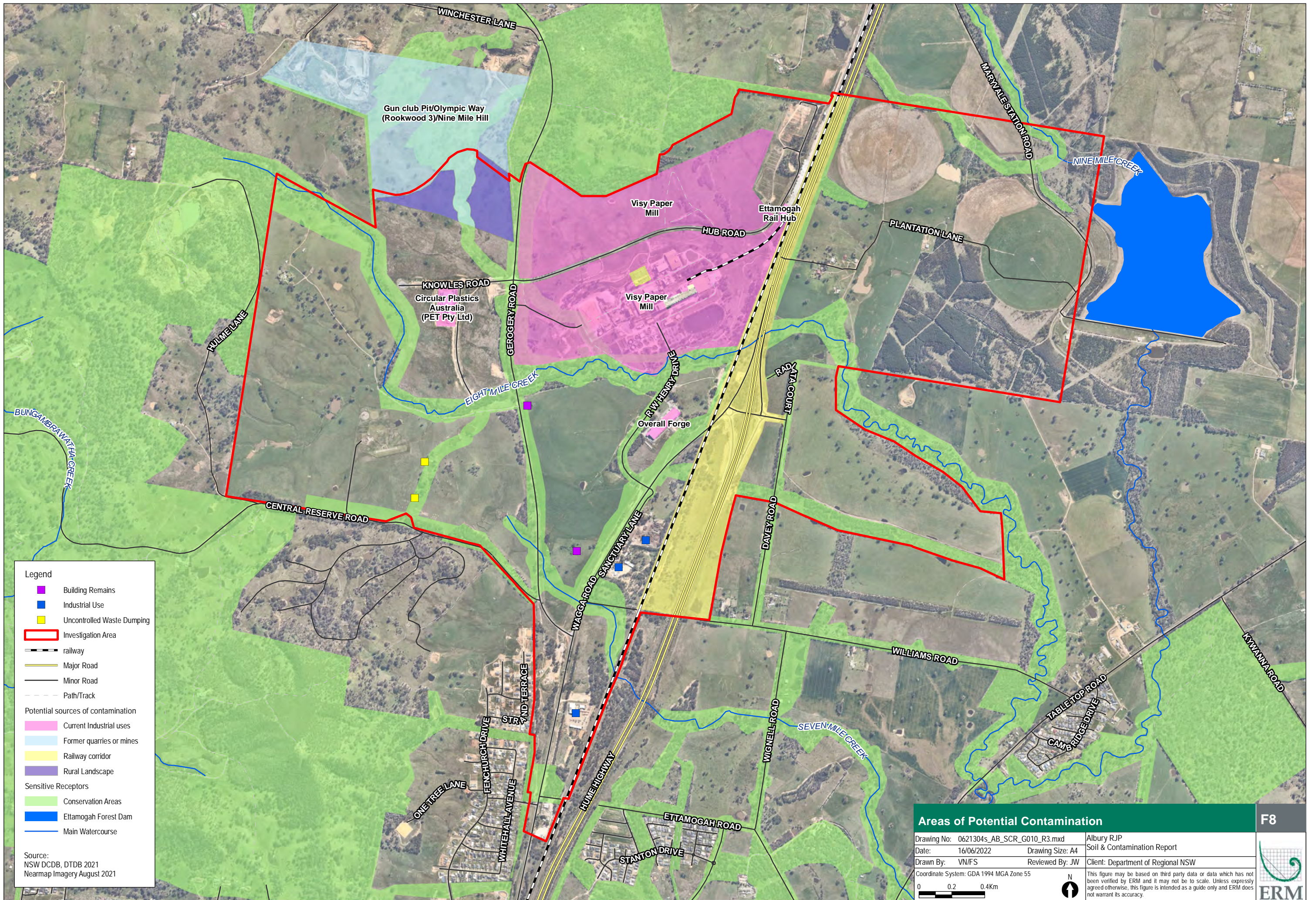
The following summary of the CSM for the Albury RJP has been prepared based on the desktop assessment, site inspection and preliminary sampling as discussed in the above sections. The location of the potential sources of contamination are illustrated in Figure 8.

7.4.1 Potential Sources of Contamination

Based on the site history and background data reviewed and ERMs professional experience, the Contaminants of Potential Concern (CoPC) associated with current and historical land uses undertaken in the general area are considered to include the following:

Potential Source	CoPC	Comment
AEC – 1 VISY Paper Mill	<ul style="list-style-type: none"> TRH, BTEX, Solvents, Chlorinated Hydrocarbons (CHC), PAH, Heavy Metals, PFAS, PCBs and Asbestos. 	<ul style="list-style-type: none"> Onsite fuel and chemical storage Leaks and spills of fuels / chemicals associated with refuelling and maintenance Hazardous materials associated with degrading building structures. Chemicals used in pulping and paper manufacturing.
AEC – 2 Overall Forge	<ul style="list-style-type: none"> TRH, BTEX, Solvents, Chlorinated Hydrocarbons (CHC), PAH, Heavy Metals, PFAS, PCBs and Asbestos. 	<ul style="list-style-type: none"> Onsite fuel and chemical storage Chlorinated solvents as degreasers Solvents for metal cleaning Leaks and spills of fuels / chemicals associated with refuelling and maintenance Hazardous materials associated with degrading building structures. Potential storage of firefighting foams due to flammable liquids storage.
AEC – 3 Ettamogah Rail Hub	<ul style="list-style-type: none"> TRH, BTEX, Solvents, PAH, Heavy Metals, PCBs and Asbestos. 	<ul style="list-style-type: none"> Onsite fuel and chemical storage Leaks and spills of fuels / chemicals associated with refuelling and maintenance Hazardous materials associated with degrading building structures.
AEC – 4 Other On-site Commercial / Industrial Land Uses	<ul style="list-style-type: none"> TRH, BTEX, Solvents, PAH, Heavy Metals, PCBs and Asbestos. 	<ul style="list-style-type: none"> Onsite fuel and chemical storage Leaks and spills of fuels / chemicals associated with refuelling and maintenance Hazardous materials associated with degrading building structures.
AEC – 5 Hazardous Materials Associated with Current and Former Structures / Service Conduits etc.	<ul style="list-style-type: none"> Asbestos, heavy metals and Polychlorinated Biphenyl (PCBs) 	<ul style="list-style-type: none"> Potential building waste from demolition of former building structures located within the Site and adjacent area. Potential redundant service lines / conduits
AEC – 6 Sewer / Septic Lines and Tanks	<ul style="list-style-type: none"> Pathogens (E Coli and Enterococci) Nutrients, Phosphorus, Nitrates, Nitrogen and Heavy Metals. 	<ul style="list-style-type: none"> Potential leaks from current and former sewer lines / septic tanks within the site

Potential Source	CoPC	Comment
AEC – 7 General Site Usage	<ul style="list-style-type: none"> ■ TRH, BTEX, Solvents, Chlorinated Hydrocarbons (CHC), PAH, Heavy Metals, PFAS, PCBs, OCP/OPP, Herbicides, Phosphates, Nutrients and Asbestos. 	<ul style="list-style-type: none"> ■ Potential use of nutrients / fertilisers within irrigated portions of Site ■ Current and historical agricultural land uses ■ Area of excavation / clearing located within central portion of the Site ■ Current / former farm dams collecting potential contaminated surface water run off
AEC – 8 Surrounding Agricultural, Defence and Commercial Industrial Land Uses	<ul style="list-style-type: none"> ■ TRH, BTEX, Solvents, Chlorinated Hydrocarbons (CHC), PAH, Heavy Metals, PFAS, PCBs, Asbestos, explosive residues, Ammonia, Landfill gases (e.g. methane), Total Dissolved Solids (TDS) and PFAS 	<ul style="list-style-type: none"> ■ Industrial, Defence and agricultural use of the areas surrounding the site.



Legend

- Building Remains
- Industrial Use
- Uncontrolled Waste Dumping
- Investigation Area
- railway
- Major Road
- Minor Road
- Path/Track

Potential sources of contamination

- Current Industrial uses
- Former quarries or mines
- Railway corridor
- Rural Landscape

Sensitive Receptors

- Conservation Areas
- Ettamogah Forest Dam
- Main Watercourse

Source:
NSW DCDB, DTDB 2021
Nearmap Imagery August 2021

Areas of Potential Contamination		F8
Drawing No: 0621304s_AB_SCR_G010_R3.mxd	Albury RJP	
Date: 16/06/2022	Drawing Size: A4	
Drawn By: VN/FS	Reviewed By: JW	Client: Department of Regional NSW
Coordinate System: GDA 1994 MGA Zone 55		This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.

7.4.2 Potential Pathways

The primary potential exposure pathways of concern at the site are:

- Inhalation of vapour (from soil and/or groundwater) and contaminated dust (from soils).
- Dermal contact and / or incidental ingestion with contaminated surface water and soils / sediments.
- Transport of contamination through surface water flows.
- Transport of contamination to underlying groundwater aquifers.
- Transport of contaminants through mechanical transport (i.e., excavation, tracking during vehicle movement etc.).

7.4.3 Potential Receptors

Key receptors have been identified as:

- Current site users (agricultural, residential and commercial / industrial).
- Future site users (agricultural, residential and commercial / industrial).
- Potential future users of groundwater (identified use of groundwater for a range of purposes).
- Workers carrying out construction, installation or maintenance works within the site.
- Groundwater beneath the site.
- Adjacent sensitive receptors e.g., adjacent residents, cattle (or other grazing animals) and sensitive ecological receptors.

7.4.4 Preliminary Conceptual Site Model

Based on the results of the desktop assessment, site inspection and the potential sources, pathways and receptors identified above, ERM developed the below Conceptual Site Model (CSM).

Potential Sources	Pathways	Potential Receptors	Risk of Potentially Complete Pollutant Linkage	Comment
AEC – 1 VISY Paper Mill	<ul style="list-style-type: none"> ■ Dermal contact, inhalation, and / or incidental ingestion with contaminated surface waters / soils. 	<ul style="list-style-type: none"> ■ Current and future site users; and ■ Workers carrying out development, installation or maintenance works within the site. 	<ul style="list-style-type: none"> ■ Moderate to High 	<ul style="list-style-type: none"> ■ The paper mill has been present in the central portion of the site since the early 1960s.
	<ul style="list-style-type: none"> ■ Transport of contamination through surface water flows. 	<ul style="list-style-type: none"> ■ Adjacent sensitive receptors; ■ Current and future site users; and ■ Workers carrying out development, installation or maintenance works within the site. 	<ul style="list-style-type: none"> ■ Moderate to High 	
	<ul style="list-style-type: none"> ■ Transport of contamination to underlying groundwater aquifers 	<ul style="list-style-type: none"> ■ Adjacent sensitive receptors; and ■ Future potential on-site users of groundwater. 	<ul style="list-style-type: none"> ■ Moderate to High 	
	<ul style="list-style-type: none"> ■ Transport of contaminants through mechanical transport 	<ul style="list-style-type: none"> ■ Workers carrying out development, installation or maintenance works within the site. 	<ul style="list-style-type: none"> ■ Moderate to High 	
AEC – 2 Overall Forge	<ul style="list-style-type: none"> ■ Dermal contact, inhalation, and / or incidental ingestion with contaminated surface waters / soils. 	<ul style="list-style-type: none"> ■ Current and future site users; and ■ Workers carrying out development, installation or maintenance works within the site. 	<ul style="list-style-type: none"> ■ Moderate to High 	<ul style="list-style-type: none"> ■ The forge has been on site since the late 80's to early 90's.

Potential Sources	Pathways	Potential Receptors	Risk of Potentially Complete Pollutant Linkage	Comment
	<ul style="list-style-type: none"> Transport of contamination through surface water flows. 	<ul style="list-style-type: none"> Adjacent sensitive receptors; Current and future site users; and Workers carrying out development, installation or maintenance works within the site. 	<ul style="list-style-type: none"> Moderate to High 	
	<ul style="list-style-type: none"> Transport of contamination to underlying groundwater aquifers 	<ul style="list-style-type: none"> Adjacent sensitive receptors; and Future potential on-site users of groundwater. 	<ul style="list-style-type: none"> Moderate to High 	
	<ul style="list-style-type: none"> Transport of contaminants through mechanical transport 	<ul style="list-style-type: none"> Workers carrying out development, installation or maintenance works within the site. 	<ul style="list-style-type: none"> Moderate to High 	
AEC – 3 Ettamogah Rail Hub	<ul style="list-style-type: none"> Dermal contact, inhalation, and / or incidental ingestion with contaminated surface waters / soils. 	<ul style="list-style-type: none"> Current and future site users; and Workers carrying out development, installation or maintenance works within the site. 	<ul style="list-style-type: none"> Moderate 	<ul style="list-style-type: none"> The rail hub has been constructed in the 2000's The rail line has been present on the site since the 1960s.
	<ul style="list-style-type: none"> Transport of contamination through surface water flows. 	<ul style="list-style-type: none"> Adjacent sensitive receptors; Current and future site users; and Workers carrying out development, installation or maintenance works within the site. 	<ul style="list-style-type: none"> Moderate 	
	<ul style="list-style-type: none"> Transport of contamination to underlying groundwater aquifers 	<ul style="list-style-type: none"> Adjacent sensitive receptors; and Future potential on-site users of groundwater. 	<ul style="list-style-type: none"> Moderate 	

Potential Sources	Pathways	Potential Receptors	Risk of Potentially Complete Pollutant Linkage	Comment
	<ul style="list-style-type: none"> Transport of contaminants through mechanical transport 	<ul style="list-style-type: none"> Workers carrying out development, installation or maintenance works within the site. 	<ul style="list-style-type: none"> Moderate 	
AEC – 4 Other On-site Commercial / Industrial Land Uses	<ul style="list-style-type: none"> Dermal contact, inhalation, and / or incidental ingestion with contaminated surface waters / soils. 	<ul style="list-style-type: none"> Current and future site users; and Workers carrying out development, installation or maintenance works within the site. 	<ul style="list-style-type: none"> High 	<ul style="list-style-type: none"> A review of aerial imagery indicates commercial / industrial properties located throughout the Site. Potential for the storage, handling and use of a range of chemicals within operational processes. Most other commercial/industrial land use appear to be associate with materials handling and plant storage.
	<ul style="list-style-type: none"> Transport of contamination through surface water flows. 	<ul style="list-style-type: none"> Adjacent sensitive receptors; Current and future site users; and Workers carrying out development, installation or maintenance works within the site. 	<ul style="list-style-type: none"> Low to Moderate 	
	<ul style="list-style-type: none"> Transport of contamination to underlying groundwater aquifers 	<ul style="list-style-type: none"> Adjacent sensitive receptors; and Future potential on-site users of groundwater. 	<ul style="list-style-type: none"> Low to Moderate 	
	<ul style="list-style-type: none"> Transport of contaminants through mechanical transport 	<ul style="list-style-type: none"> Workers carrying out development, installation or maintenance works within the site. 	<ul style="list-style-type: none"> High 	
AEC – 5 Hazardous Materials Associated with Current and Former Structures / Service Conduits etc.	<ul style="list-style-type: none"> Dermal contact, inhalation, and / or incidental ingestion with contaminated surface waters / soils. 	<ul style="list-style-type: none"> Current and future site users; and Workers carrying out development, installation or maintenance works within the site. 	<ul style="list-style-type: none"> Low 	<ul style="list-style-type: none"> Potential for hazardous materials to be present within onsite service conduits. A detailed assessment / survey of onsite services

Potential Sources	Pathways	Potential Receptors	Risk of Potentially Complete Pollutant Linkage	Comment
	<ul style="list-style-type: none"> Transport of contamination through surface water flows. 	<ul style="list-style-type: none"> Adjacent sensitive receptors; Current and future site users; and Workers carrying out development, installation or maintenance works within the site. 	<ul style="list-style-type: none"> Low 	<ul style="list-style-type: none"> would be required to assess the extent of onsite service conduits and the potential for hazardous materials to be present within pits / conduits etc.
	<ul style="list-style-type: none"> Transport of contamination to underlying groundwater aquifers 	<ul style="list-style-type: none"> Adjacent sensitive receptors; and Future potential on-site users of groundwater. 	<ul style="list-style-type: none"> Low – Moderate 	
	<ul style="list-style-type: none"> Transport of contaminants through mechanical transport 	<ul style="list-style-type: none"> Workers carrying out development, installation or maintenance works within the site. 	<ul style="list-style-type: none"> Moderate 	
AEC – 6 Sewer / Septic Lines	<ul style="list-style-type: none"> Dermal contact, inhalation, and / or incidental ingestion with contaminated surface waters / soils. 	<ul style="list-style-type: none"> Current and future site users; and Workers carrying out development, installation or maintenance works within the site. 	<ul style="list-style-type: none"> Low 	<ul style="list-style-type: none"> A number of sewer lines to are likely to be present and bisecting the site. Due to the age of the Site there is also the potential for septic tanks to be present.
	<ul style="list-style-type: none"> Transport of contamination through surface water flows. 	<ul style="list-style-type: none"> Adjacent sensitive receptors; Current and future site users; and Workers carrying out development, installation or maintenance works within the site. 	<ul style="list-style-type: none"> Low 	
	<ul style="list-style-type: none"> Transport of contamination to underlying groundwater aquifers 	<ul style="list-style-type: none"> Adjacent sensitive receptors; and Future potential on-site users of groundwater. 	<ul style="list-style-type: none"> Low – Moderate 	

Potential Sources	Pathways	Potential Receptors	Risk of Potentially Complete Pollutant Linkage	Comment
	<ul style="list-style-type: none"> Transport of contaminants through mechanical transport 	<ul style="list-style-type: none"> Workers carrying out development, installation or maintenance works within the site. 	<ul style="list-style-type: none"> Moderate 	
AEC – 7 General Site Usage	<ul style="list-style-type: none"> Dermal contact, inhalation, and / or incidental ingestion with contaminated surface waters / soils. 	<ul style="list-style-type: none"> Current and future site users; and Workers carrying out development, installation or maintenance works within the site. 	<ul style="list-style-type: none"> Moderate 	<ul style="list-style-type: none"> Current and historical uses of the site for agricultural purposes. A model airplane club with sealed runway is present on site but presents a low risk due to it not being suitable for full sized aircraft to use. Potential historical land uses including stockpiling of waste soils, general vehicle maintenance etc. may have been undertaken within the Site
	<ul style="list-style-type: none"> Transport of contamination through surface water flows. 	<ul style="list-style-type: none"> Adjacent sensitive receptors; Current and future site users; and Workers carrying out development, installation or maintenance works within the site. 	<ul style="list-style-type: none"> Moderate - High 	
	<ul style="list-style-type: none"> Transport of contamination to underlying groundwater aquifers 	<ul style="list-style-type: none"> Adjacent sensitive receptors; and Future potential on-site users of groundwater. 	<ul style="list-style-type: none"> Low – Moderate 	
	<ul style="list-style-type: none"> Transport of contaminants through mechanical transport 	<ul style="list-style-type: none"> Workers carrying out development, installation or maintenance works within the site. 	<ul style="list-style-type: none"> Moderate 	
AEC – 8 Off-site Uses (outside RJP)	<ul style="list-style-type: none"> Dermal contact, inhalation, and / or incidental ingestion with contaminated surface waters / soils. 	<ul style="list-style-type: none"> Current and future site users; and Workers carrying out development, installation or maintenance works within the site. 	<ul style="list-style-type: none"> Moderate 	<ul style="list-style-type: none"> Former military use of Ettamogah Army Stores Depot including potential for contamination and UXO adjoining the southern boundary of the RJP

Potential Sources	Pathways	Potential Receptors	Risk of Potentially Complete Pollutant Linkage	Comment
	<ul style="list-style-type: none"> Transport of contamination through surface water flows. 	<ul style="list-style-type: none"> Adjacent sensitive receptors; Current and future site users; and Workers carrying out development, installation or maintenance works within the site. 	<ul style="list-style-type: none"> Moderate – High 	<ul style="list-style-type: none"> Disused quarries adjoining the RJP boundary Current and historical uses of the surrounding area for agricultural and commercial / industrial purpose.
	<ul style="list-style-type: none"> Transport of contamination to underlying groundwater aquifers 	<ul style="list-style-type: none"> Adjacent sensitive receptors; and Future potential on-site users of groundwater. 	<ul style="list-style-type: none"> Low – Moderate 	
	<ul style="list-style-type: none"> Transport of contaminants through mechanical transport 	<ul style="list-style-type: none"> Workers carrying out development, installation or maintenance works within the site. 	<ul style="list-style-type: none"> Moderate 	

Whilst a number of potentially complete source-pathway-receptor (SPR) linkages have been identified in the CSM outlined above, it is anticipated that many of these would likely be able to be addressed / closed out via the recommended further investigations particularly those described in AEC's 4 – 8 which apply to the site more broadly rather than specific point sources / known industrial uses. None of the issues identified represent contamination risks which are likely to be beyond current industry capacity / ability to manage during the development process.

8. REVIEW OF MASTER PLAN

8.1 Review of Master Plan and Potential Constraints

The following section outlines the potential constraints identified in the review of the proposed Master Plan (dated 4 March 2022) in light of the preliminary assessment of soils and contamination presented above in this report.

8.2 Salinity

The potential presence of localised salinity and potentially aggressive soils and foundation hazards across has been highlighted by the available soils mapping.

The preliminary assessment across the RJP indicates that surface soils are typically non-saline but with sodic and highly sodic conditions reported in the northern and eastern parts of the RJP. The preliminary assessment across the RJP indicates that surface soils are non-aggressive to steel and concrete (2 samples indicated mildly aggressive to concrete based on pH <5.5). It is noted that the preliminary sampling was intended to provide a high level assessment to inform the assessment of the proposed Master Plan and as such was limited in scope and the depth of assessment.

Whilst the salinity, sodicity and aggressivity soil conditions are unlikely to represent a significant constraint on the proposed Master Plan, and ongoing management is unlikely to be required, the findings of the preliminary assessment should be considered in the development design process and the selection of suitable construction materials. A geotechnical assessment is likely to be a requirement of detailed design for development within the RJP; this should be designed to consider local soil salinity and aggressivity conditions to inform the selection of appropriate design and construction materials for the protection of built structures. A detailed assessment of localised salinity and sodicity should also be considered in areas proposed for future conservation or recreation where vegetation planting is proposed.

In addition to the above, it is noted that salinity conditions are dependent on several variables, which include surface water infiltration to soil and groundwater levels which may be modified by development in the area. The application of the principles of Water Sensitive Urban Design should be considered in the proposed development areas to mitigate potential changes to soil water levels and salinity conditions in the catchment. The impact of the extraction of groundwater for beneficial re-use on catchment level salinity conditions should also be considered, and groundwater monitoring for salinity may be required.

ERM understands that a hydrogeological assessment has been proposed by SMEC, to support a site wide assessment of existing groundwater conditions and modelling of water balance, which includes monitoring locations which (following discussion with SMEC) are considered suitable for assessment of salinity. The salinity assessment analytes are a component of baseline groundwater chemistry analytes (i.e., pH, EC, major ions) which would be considered in the hydrogeological assessment. In addition, the existing bores currently monitored by Visy in the irrigated land near Ettamogah Forest Dam should be included in the monitoring program to assess potential salinity impacts associated with irrigation. At this stage there is insufficient information on which to base any detailed recommendations for ongoing monitoring for salinity. For reference, Figure 11 shows the location of the existing monitoring bores (Visy) and the location of monitoring bores recommended by SMEC in the hydrogeological assessment. Further recommendations can be made for on-going monitoring, if required following the outcomes of the hydrogeological assessment.

8.3 Acid Sulfate Soils Potential Constraints

Whilst the preliminary assessment did not identify Actual or Potential ASS (AASS or PASS) in the sampled locations, some areas of acidic soils were identified (as described in Section 6.3.2 above). It is noted that the preliminary sampling was intended to provide a high level assessment to inform the assessment of the proposed Master Plan and as such was limited in scope and the depth of assessment. Given that much of the Investigation Area falls within mapped areas of high risk for ASS, it would be prudent for any future development undertaken within these mapped high risk areas to further consider the potential for occurrence of inland ASS as part of the site specific geotechnical assessment /design. This is particularly relevant to any development where foundations, services or other structures are likely to extend below the water table, require dewatering which may lower the water table or otherwise oxidise PASS.

8.4 Contamination Potential Constraints

8.4.1 Potential for Contamination

Based on the findings of the PSI, the following areas of potential contamination have been identified within the Albury RJP:

- Specific sites which are currently or formerly operated potentially contaminating industries and/or activities (as listed in Appendix 1 of the Contaminated Land Planning Guidelines (Draft)), have the potential for contamination to be present:
 - VISY Paper Mill,
 - Overall Forge
 - Ettamogah Rail Hub
 - Circular Plastics Australia (PET) Pty Ltd (plastics recycling facility)
 - Rural industry (primarily stockpiling of soils, holding yards for agricultural supplies, chemicals and vehicles) located on Wagga Road in the southern part of the RJP.
- The remaining land has the broad potential for contamination associated with:
 - Built structures and/or infrastructure (current), which may include hazardous building materials (such as asbestos, lead paints, PCBs) that may pose a risk if demolished in an uncontrolled manner;
 - General rural use sites which may currently or formerly had chemical storage and use including but not limited to underground or above-ground chemical storage tanks.
 - Remains of built structures and/or infrastructure which have been demolished in an uncontrolled manner, which may include hazardous building materials such as asbestos (as observed at 2 sites within the RJP); and
 - Uncontrolled waste dumping (as observed at 2 sites within the RJP).

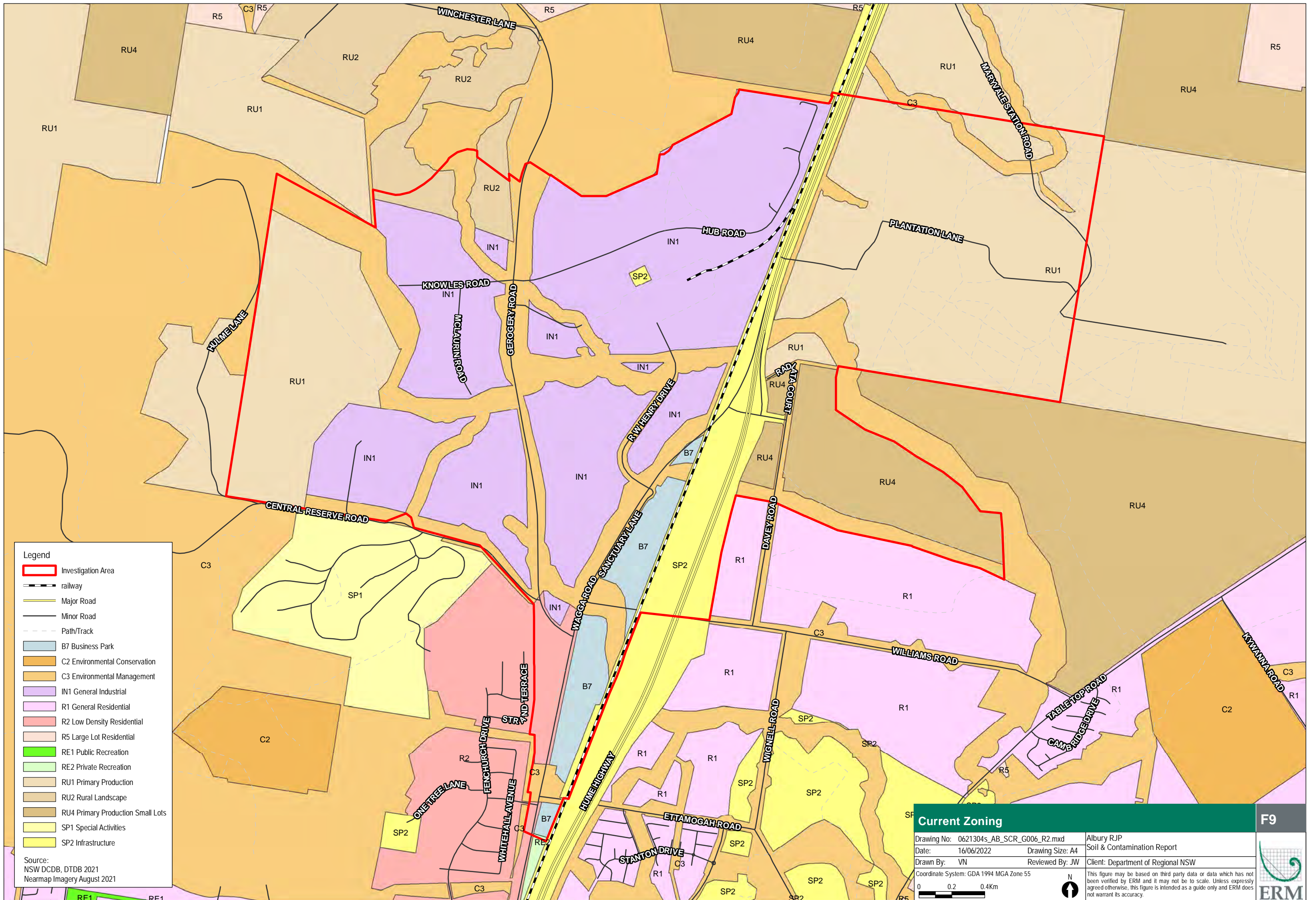
8.4.2 Review of the Master Plan

The Master Plan (dated 4 March 2022) proposes some changes to land-use, in most instances these changes are predominantly a change to a similar or less sensitive land-use from a contamination perspective. The current zoning is depicted in Figure 9 and the proposed Master Plan land-uses are depicted in Figure 10. The triggers for further assessment of potential contamination are set out in Clause 4.6(4) of the *SEPP*.

Generally, the triggers for further contamination assessment under Clause 4.6(4) of the *SEPP* would only be met where the proposed changes to land-use under the Master Plan for the Albury RJP are (i) for residential, educational, recreational or child care purposes or for the purpose of a hospital; AND (ii) the land is not currently or formerly used for potentially contaminating activities (as listed in Table 1

to the contaminated land planning guidelines). Where the land is currently used for potentially contaminating activities at the specific industrial sites (as listed above), and no change is proposed under the Master Plan, it is unlikely that further assessment would be triggered under Clause 4.6(4) of the *SEPP*.

In addition to the above it is important to note that there is broad potential for contamination on all land across the RJP associated with hazardous building materials, small scale chemical storage and use and uncontrolled waste dumping. This potential contamination should be assessed further prior to approval of development to prevent potential exposure to contamination hazards. The guidance provided in Contaminated Land Planning Guidelines (Draft) should be considered in relation to the application of due diligence by Council in consideration of a process for assessment of potential for hazardous building materials (e.g., asbestos) prior to development commencement. A clear framework for management of these risks is needed for public safety and to mitigate the potential for substantial cost and time delays.

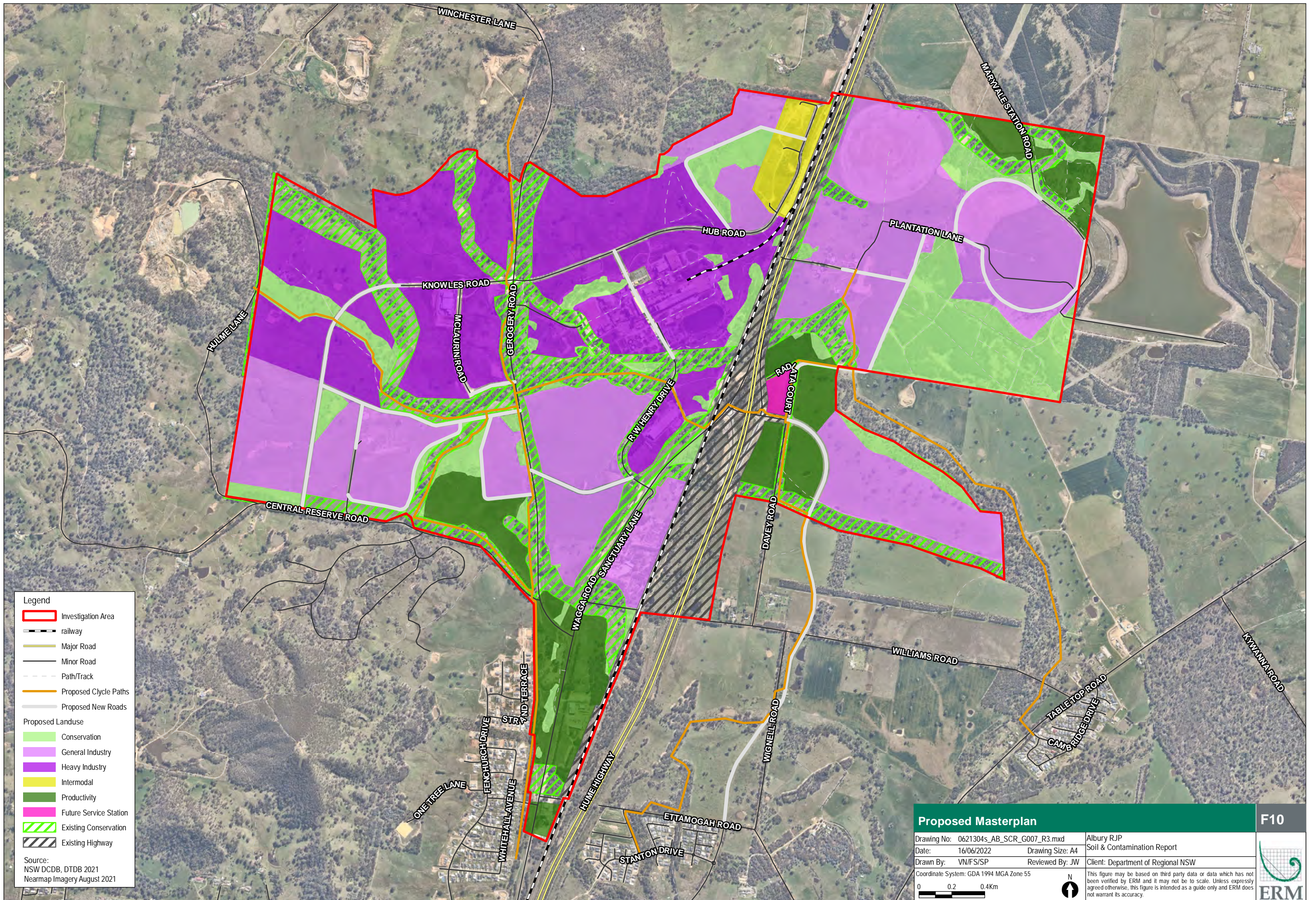


Legend

- Investigation Area
- railway
- Major Road
- Minor Road
- Path/Track
- B7 Business Park
- C2 Environmental Conservation
- C3 Environmental Management
- IN1 General Industrial
- R1 General Residential
- R2 Low Density Residential
- R5 Large Lot Residential
- RE1 Public Recreation
- RE2 Private Recreation
- RU1 Primary Production
- RU2 Rural Landscape
- RU4 Primary Production Small Lots
- SP1 Special Activities
- SP2 Infrastructure

Source:
NSW DCDB, DTDB 2021
Nearmap Imagery August 2021

Current Zoning		F9
Drawing No: 0621304s_AB_SCR_G006_R2.mxd	Albury RJP	
Date: 16/06/2022	Drawing Size: A4	Soil & Contamination Report
Drawn By: VN	Reviewed By: JW	Client: Department of Regional NSW
Coordinate System: GDA 1994 MGA Zone 55		
 0 0.2 0.4km	 N	This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.



Legend

- Investigation Area
- railway
- Major Road
- Minor Road
- Path/Track
- Proposed Cycle Paths
- Proposed New Roads
- Proposed Landuse**
- Conservation
- General Industry
- Heavy Industry
- Intermodal
- Productivity
- Future Service Station
- Existing Conservation
- Existing Highway

Source:
NSW DCDB, DTDB 2021
Nearmap Imagery August 2021

Proposed Masterplan		F10
Drawing No: 0621304s_AB_SCR_G007_R3.mxd	Albury RJP	
Date: 16/06/2022	Drawing Size: A4	
Drawn By: VN/FS/SP	Reviewed By: JW	Client: Department of Regional NSW
Coordinate System: GDA 1994 MGA Zone 55		This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.

Table 8-1 Summary of Proposed Master Plan and Contamination Assessment Triggers in SEPP (Resilience and Hazards)

Potential Contamination	Potential Sources of Contamination from CSM	Current Zoning	Master Plan Proposed Changes to Land Use	Does the Master Plan Trigger Contamination Assessment in accordance with SEPP (Resilience and Hazards)?
Specific activities	AEC – 1 VISY Paper Mill	General Industrial	Heavy Industry	No
	AEC – 2 Overall Forge	General Industrial	Heavy Industry	No
	AEC – 3 Ettamogah Rail Hub	General Industrial	Intermodal Hub	Yes - if re-development of the existing rail hub is proposed this may trigger need for contamination assessment.
Non-specific (general) Industrial Uses: *Circular Plastics Australia (PET) Pty Ltd *Agricultural suppliers	AEC – 4 Other On-site Commercial / Industrial Land Uses	Industrial Park (B7) General Industrial (IN1)	Yes	Yes
			No	No Apply principles of SEPP (Resilience and Hazards) Due diligence to be used to establish a process for assessment of potential for hazardous building materials (e.g., asbestos) prior to development commencement.
Built structures & infrastructure (General Rural Uses)	AEC – 5, 6, 7 & 8 Hazardous Materials Associated with Current and Former Structures / Service Conduits etc. AEC – 6 Sewer / Septic Lines AEC – 7 General Site Usage AEC – 8 Surrounding Agricultural and Commercial Industrial Land Uses	All other areas	Yes	Yes RU1 to Recreation (north-east corner of RJP) may trigger further assessment of contamination
			No	No Apply principles of SEPP (Resilience and Hazards) Due diligence to be used to establish a process for assessment of potential for hazardous building materials (e.g., asbestos) prior to development commencement.

8.4.3 Where Further Contamination Assessment is Required

The investigation and/or remediation of potential contamination should be guided by the EP&A Act, the SEPP (Resilience and Hazards) and the CLM Act.

Where further contamination assessment is required, the draft Contaminated Land Planning Guidelines (Draft) provides detailed guidance for the planning proposal and rezoning process in accordance with SEPP (Resilience and Hazards). If further assessment is triggered under the SEPP, this may include the following assessments which can be undertaken by the proponent at the individual site level:

- Preliminary Site Investigation;
- Detailed Site Investigation;
- Remediation Action Plan;
- Validation Report; and/or
- Site Audit Report & Statement.

Contamination assessments should be undertaken by suitably qualified and experienced consultants. In some circumstances, a statutory Site Audit may be required (refer to the draft Contaminated Land Planning Guidelines for further information on when a statutory Site Audit is required).

For planning decision making the use of suitably qualified and experienced consultants in conducting third-party formal independent review should be considered where a statutory Site Audit is not required and a non-statutory audit may be onerous on the proponent. The Contaminated Land Planning Guidelines (draft) refer to the following certifications which are currently recognised by NSW EPA:

- Environment Institute of Australia and New Zealand - Certified Environmental Practitioner (Site Contamination) (CEnvP (SC))
- Soil Science Australia - Certified Professional Soil Scientist Contaminated Site Assessment and Management (CPSS CSAM)

8.4.4 Mitigation of Future Contamination Risk

Where new industrial development is proposed, Council should consider the following key principles from the *Contaminated Land Planning Guidelines* (Draft) for proactive measures to prevent future contamination from occurring:

- “Development applications for new or expanding developments should include information on the potential for the activity to contaminate including details about the type of chemicals to be used or stored on the land, particularly for uses listed in Appendix 1;
- In assessing development applications for uses or activities which could be a source of contamination, planning authorities should ensure that the technical and management controls are adequate to prevent contamination and use appropriate conditions of consent or approval (such as a requirement for monitoring and EMPs) to ensure that such controls are applied. Plant design should aim to reduce waste production and minimise or eliminate the release of waste into the environment by, for example, appropriate primary and secondary containment and good work practices;
- Periodic environmental audits should be conducted and the use of clean, alternative technologies promoted; and,
- Improved technologies, waste management practices and environmental management practices should be identified and promoted.”

9. CONCLUSIONS AND RECOMMENDATIONS

ERM was engaged by DRNSW to prepare a Technical Report focused on contamination, soils, and geology for the property identified as the Albury RJP (the Site).

This Technical Report provides an analysis of soils, contamination and geology issues at the Site to aid the Client in gaining a preliminary understanding of the potential opportunities and constraints to future development associated with these issues with the Albury RJP. This technical report has been designed to test the preferred structure plan that was developed as part of a series of Integration Workshops and aims to establish the relevant specifications and requirements to assist in the development of the Master Plan.

In summary, this report has identified the following constraints which should be considered as part of the development of the Master Plan:

- The preliminary assessment indicates that surface soils are typically non-saline, with sodic and highly sodic conditions reported in the northern and eastern parts of the RJP, and that surface soils are typically non-aggressive or mildly aggressive to steel and concrete (2 samples indicated mildly aggressive to concrete based on pH <5.5). Whilst the salinity, sodicity and aggressivity soil conditions are unlikely to represent a significant constraint on the proposed Master Plan, and ongoing management is unlikely to be required, the findings of the preliminary assessment should be considered in the development design process and the selection of suitable construction materials.
- The available soil mapping indicates there is a high probability of acid sulfate soils being present on the majority of the site, with an extremely low probability present on the western slopes of the site. Whilst the preliminary assessment did not identify Actual or Potential ASS (AASS or PASS) in the sampled locations, some areas of acidic soils were identified.
- Potential contamination was identified based on the PSI (no sampling was undertaken) at specific sites which are currently (or formerly) operated potentially contaminating industries and/or activities, including:
 - VISY Paper Mill,
 - Overall Forge
 - Ettamogah Rail Hub
 - Circular Plastics Australia (PET) Pty Ltd (plastics recycling facility)
 - Rural industry (primarily stockpiling of soils, holding yards for agricultural supplies, chemicals and vehicles) located on Wagga Road in the southern part of the RJP.

The remaining land has the broad potential for contamination associated with hazardous building materials (such as asbestos) associated with built structures and/or infrastructure (current or former), chemical storage and use including but not limited to underground or above-ground chemical storage tanks, uncontrolled waste dumping (as observed at 2 sites).

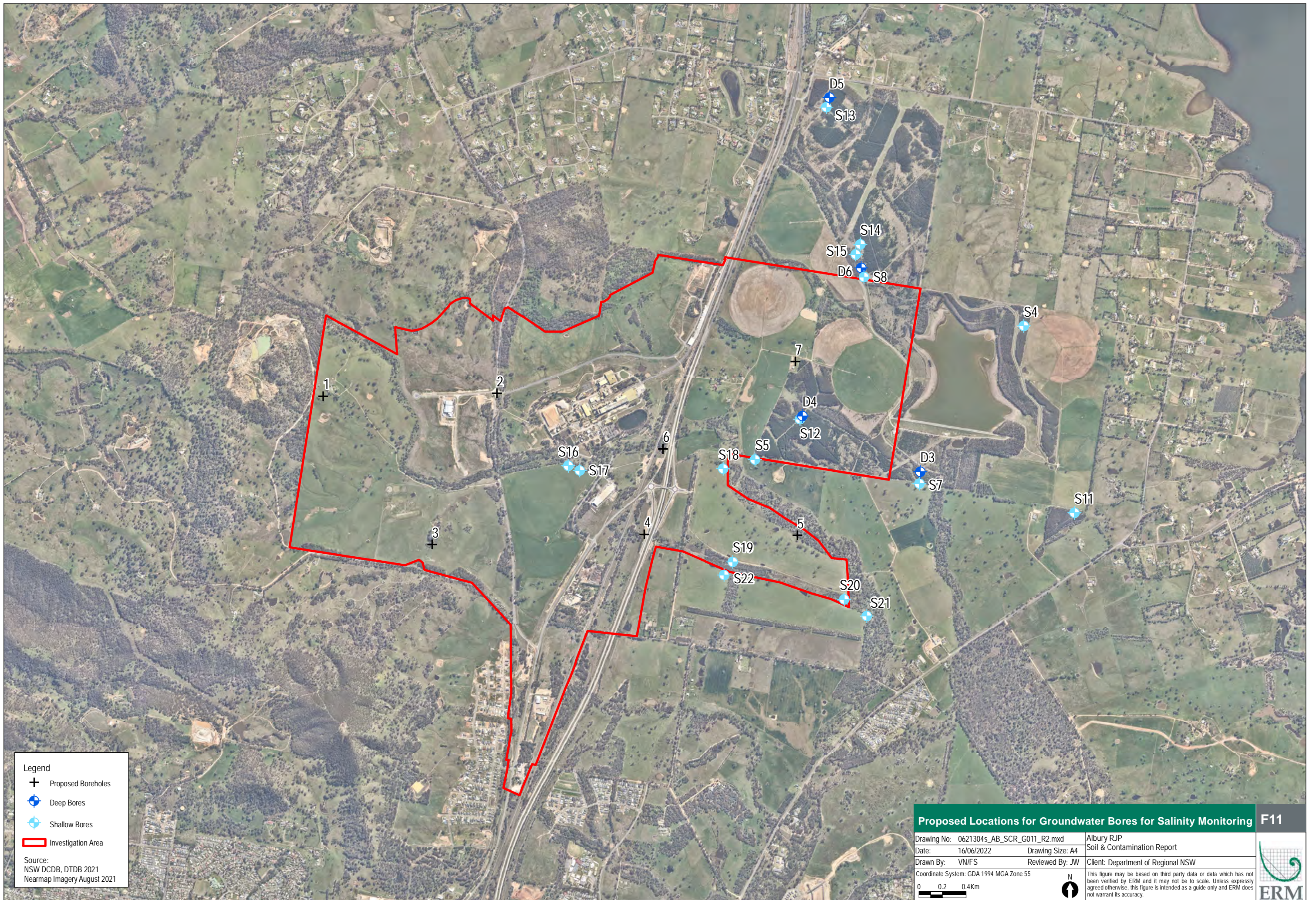
- Generally, the triggers for further contamination assessment under Clause 4.6(4) of the *SEPP* would only be met where the proposed changes to land-use under the Master Plan for the Albury RJP are (i) for residential, educational, recreational or child care purposes or for the purpose of a hospital; AND (ii) the land is not currently or formerly used for potentially contaminating activities (as listed in Table 1 to the contaminated land planning guidelines). Where the land is currently used for potentially contaminating activities at the specific industrial sites (as listed above), and no change is proposed under the Master Plan, it is unlikely that further assessment would be triggered under Clause 4.6(4) of the *SEPP*.

- In addition to the above it is important to note that there is a broad potential for contamination on all land across the RJP associated with hazardous building materials, small scale chemical storage and use and uncontrolled waste dumping, which should be assessed further prior to approval of development to prevent potential exposure to contamination hazards.

The following recommendations should be considered during the appropriate phases of the planning process:

- As a geotechnical assessment is likely to be a requirement of detailed design for development within the RJP, this should be designed to consider local soil salinity and aggressivity conditions to inform the selection of appropriate design and construction materials for the protection of built structures.
- A detailed assessment of localised salinity and sodicity should also be considered in areas proposed for future conservation or recreation where vegetation planting is proposed.
- The application of the principles of Water Sensitive Urban Design should be considered in the proposed development areas to mitigate potential changes to soil water levels and salinity conditions in the catchment. The impact of the extraction of groundwater for beneficial re-use on catchment level salinity conditions should also be considered, and groundwater monitoring for salinity may be required. ERM understands that a hydrogeological assessment has been proposed by SMEC, to support a site wide assessment of existing groundwater conditions and modelling of water balance, which includes monitoring locations which (following discussion with SMEC) are considered suitable for assessment of salinity. The salinity assessment analytes are a component of baseline groundwater chemistry analytes (i.e., pH, EC, major ions) which would be considered in the hydrogeological assessment. In addition, the existing bores currently monitored by Visy in the irrigated land near Ettamogah Forest Dam should be included in the monitoring program to assess potential salinity impacts associated with irrigation. At this stage there is insufficient information on which to base any detailed recommendations for ongoing monitoring for salinity. For reference, Figure 11 shows the location of the existing monitoring bores (Visy) and the location of monitoring bores recommended by SMEC in the hydrogeological assessment. Further recommendations can be made for on-going monitoring, if required following the outcomes of the hydrogeological assessment.
- Given that much of the Investigation Area falls within mapped areas of high risk for ASS, it would be prudent for any future development undertaken within these mapped high risk areas to further consider the potential for occurrence of inland ASS as part of the site specific geotechnical assessment /design. This is particularly relevant to any development where foundations, services or other structures are likely to extend below the water table or require dewatering which may lower the water table.
- There is broad potential for contamination on all land across the RJP associated with hazardous building materials (existing or demolished structures), small scale chemical storage and use and uncontrolled waste dumping. This potential contamination should be assessed further prior to approval of development to prevent potential exposure to contamination hazards. The guidance provided in Contaminated Land Planning Guidelines (Draft) should be considered in relation to the application of due diligence by Council in consideration of a process for assessment of potential for hazardous building materials (e.g., asbestos) prior to development commencement. A clear framework for management of these risk is needed for public safety and to mitigate the potential for substantial cost and time delays.
- Where land is currently used for potentially contaminating activities at the specific industrial sites (as listed above), no change is currently proposed under the Master Plan, and it is unlikely that further assessment would be triggered under Clause 4.6(4) of the *SEPP* at these sites.
- Where land is proposed for a more sensitive land use, such as the north east corner of the RJP which is proposed for rezoning from RU1 to Recreation, this may trigger further assessment of contamination.

- If further assessment is triggered under the *SEPP*, this can be undertaken by the proponent at the individual site level during the development application stage. Contamination assessments should be undertaken by suitably qualified and experienced consultants. In some circumstances, a statutory Site Audit may be required (refer to the draft Contaminated Land Planning Guidelines for further information on when a statutory Site Audit is required). The use of suitably qualified and experienced consultants (certified by a scheme currently recognised by NSW EPA) in conducting third-party formal independent review should be considered where a statutory Site Audit is not required and a non-statutory audit may be onerous on the proponent.
- The guidance provided in Contaminated Land Planning Guidelines (Draft) should be considered in relation to the application of due diligence by Council in consideration of a process for assessment of potential for hazardous building materials (e.g., asbestos) prior to development commencement.



Legend

- Proposed Boreholes
- Deep Bores
- Shallow Bores
- Investigation Area

Source:
NSW DCDB, DTDB 2021
Nearmap Imagery August 2021

Proposed Locations for Groundwater Bores for Salinity Monitoring		F11
Drawing No: 0621304s_AB_SCR_G011_R2.mxd	Date: 16/06/2022	Drawing Size: A4
Drawn By: VN/FS	Reviewed By: JW	Client: Department of Regional NSW
Coordinate System: GDA 1994 MGA Zone 55		This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.
0 0.2 0.4Km 		

IMPORTANT LIMITATIONS AND CONTEXT

1. This report is based solely on the scope of work described in *RJP Package B – Environmental Assessment at Richmond Valley, Albury and South Jerrabomberra Procurement Registration Number P21-3009 dated 20th September 2021 (Scope of Work)* and performed by Environmental Resources Management Australia Pty Ltd (**ERM**) for The Crown in right of the State of New South Wales acting through Regional NSW (ABN 19 948 325 463) (the **Client**). The Scope of Work was governed by a contract between ERM and the Client (**Contract**).
2. No limitation, qualification or caveat set out below is intended to derogate from the rights and obligations of ERM and the Client under the Contract.
3. The findings of this report are solely based on, and the information provided in this report is strictly limited to that required by, the Scope of Work. Except to the extent stated otherwise, in preparing this report ERM has not considered any question, nor provides any information, beyond that required by the Scope of Work.
4. This report was prepared between 13 October 2021 and 2 June 2022 and is based on conditions encountered and information reviewed at the time of preparation. The report does not, and cannot, take into account changes in law, factual circumstances, applicable regulatory instruments or any other future matter. ERM does not, and will not, provide any on-going advice on the impact of any future matters unless it has agreed with the Client to amend the Scope of Work or has entered into a new engagement to provide a further report.
5. Unless this report expressly states to the contrary, ERM's Scope of Work was limited strictly to identifying typical environmental conditions associated with the subject site(s) and does not evaluate the condition of any structure on the subject site nor any other issues. Although normal standards of professional practice have been applied, the absence of any identified hazardous or toxic materials or any identified impacted soil or groundwater on the site(s) should not be interpreted as a guarantee that such materials or impacts do not exist.
6. This report is based on one or more site inspections conducted by ERM personnel, the sampling and analyses described in the report, and information provided by the Client or third parties (including regulatory agencies). All conclusions and recommendations made in the report are the professional opinions of the ERM personnel involved. Whilst normal checking of data accuracy was undertaken, except to the extent expressly set out in this report ERM:
 - a) did not, nor was able to, make further enquiries to assess the reliability of the information or independently verify information provided by;
 - b) assumes no responsibility or liability for errors in data obtained from,
the Client, any third parties or external sources (including regulatory agencies).
7. Although the data that has been used in compiling this report is generally based on actual circumstances, if the report refers to hypothetical examples those examples may, or may not, represent actual existing circumstances.
8. Only the environmental conditions and or potential contaminants specifically referred to in this report have been considered. To the extent permitted by law and except as is specifically stated in this report, ERM makes no warranty or representation about:
 - a) the suitability of the site(s) for any purpose or the permissibility of any use;
 - b) the presence, absence or otherwise of any environmental conditions or contaminants at the site(s) or elsewhere; or

- c) the presence, absence or otherwise of asbestos, asbestos containing materials or any hazardous materials on the site(s).
9. Use of the site for any purpose may require planning and other approvals and, in some cases, environmental regulator and accredited site auditor approvals. ERM offers no opinion as to the likelihood of obtaining any such approvals, or the conditions and obligations which such approvals may impose, which may include the requirement for additional environment works.
10. The ongoing use of the site or use of the site for a different purpose may require the management of or remediation of site conditions, such as contamination and other conditions, including but not limited to conditions referred to in this report.
11. This report should be read in full and no excerpts are to be taken as representative of the whole report. To ensure its contextual integrity, the report is not to be copied, distributed or referred to in part only. No responsibility or liability is accepted by ERM for use of any part of this report in any other context.
12. Except to the extent that ERM has agreed otherwise with the Client in the Scope of Work or the Contract, this report:
- a) has been prepared and is intended only for the exclusive use of the Client;
 - b) must not to be relied upon or used by any other party;
 - c) has not been prepared nor is intended for the purpose of advertising, sales, promoting or endorsing any Client interests including raising investment capital, recommending investment decisions, or other publicity purposes;
 - d) does not purport to recommend or induce a decision to make (or not make) any purchase, disposal, investment, divestment, financial commitment or otherwise in or in relation to the site(s); and
 - e) does not purport to provide, nor should be construed as, legal advice.
-


APPENDIX A DESKTOP SEARCH RESULTS

Due Diligence Insight Report

Albury RJP Investigation Area
Ettamogah, NSW

18 November 2021





Understanding your report

Your Report has been produced by Land Insight and Resources (Land Insight).

Your Report is based on information available from public databases and sources at the date of reporting. The information gathered relates to land that is within a 200 to 2000m radius (buffer zone) from the boundaries of the Property. A smaller or larger radius may be applied for certain records (as listed under records and as shown in report maps).

While every effort is made to ensure the details in your Report are correct, Land Insight cannot guarantee the accuracy or completeness of the information or data provided.

The report provided by Land Insight includes data listed on page 4 (table of contents). All sources of data and definitions are provided in the Product Guide (Attached). For a full list of references, metadata, publications or additional information not provided in this report, please contact info@liresources.com.au

The report does not include title searches; dangerous good searches or; property certificates (unless requested); or information derived from a physical inspection, such as hazardous building materials, areas of infilling or dumping/spilling of potentially contaminated materials. It is important to note that these documents and an inspection can contain information relevant to contamination that may not be identified by this Report.

Due to the ongoing nature of database development and frequency of updates provided by various state government regulators the data displayed within this report is only current from date of production.

This Report, and your use of it, is regulated by Land Insight's Terms and Conditions (See Land Insight's Product Guide).

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ATTACHMENTS

Attachment A - Report Maps

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Land Insight Product Guide and Terms and Conditions

SUMMARY

 Section 1	PROPERTY SETTING	Identified
Sensitive Receptors Planning Control Heritage Soil and Land Information Geology and Topography		
 Section 2	HYDROGEOLOGY	Identified
Aquifer Groundwater Bores and Other Borehole investigations Groundwater Dependent Ecosystems (GDE) Hydrogeology Units Wetlands		
 Section 3	ENVIRONMENTAL REGISTERS LICENCES AND INCIDENTS	Identified
Contaminated Land Public Register Sites Regulate by Other Jurisdictional Body (Former Gaswork sites / PFAS sites) Licensing and Regulated Sites National Pollutant Inventory (NPI)		
 Section 4	POTENTIALLY CONTAMINATED AREAS	Identified
Former Potentially Contaminated Land Current and Historical Potentially Contaminating activities (PCA)		
 Section 5	NATURAL HAZARDS	Identified
Erosion risk Bushfire prone land Fire history Flood hazards		



Section 1 Property Setting



1.1 SENSITIVE RECEPTORS

Map 1.1 (200m Buffer)

Sensitive receptor	Category	Distance (m)	Direction
Twin Cities Model Aero Club	Sports and Recreation Activities	0	Onsite
Wanga Park	Park	50	South

1.2 PLANNING CONTROLS

Map 1.2 (onsite)

Zoning

Code	Zoning	Details
B7	Business Park	Albury Local Environmental Plan 2010
E3	Environmental Management	
IN1	General Industrial	
R1	General Residential	
R2	Low Density Residential	
RE2	Private Recreation	
RU1	Primary Production	
RU2	Rural Landscape Zone	
RU4	Rural Small Holdings	
SP1	Special Activities	
SP2	Special Purposes Zone - Infrastructure	

Environmental Planning Instruments

Type	Category	Details
Not identified	-	-

Other Planning Information

Type	Category	Details
Not identified	-	-

1.3 HERITAGE

Map 1.3 (200m Buffer)

State and Local Heritage

Site ID	Site Name	Type	Details	Distance (m)	Direction
I316	Ettamogah Vineyard Ruins	Heritage conservation Area	Item - General significance= Local	0	Onsite
I310	Maryvale	Heritage conservation Area	Item - General significance= Local	0	Onsite

Australian Heritage Database

Site ID	Site Name	Type	Details	Distance (m)	Direction
Not identified	-	-	-	-	-

Commonwealth Heritage List, National Heritage List and World Heritage Area.

1.4 SOIL AND LAND USE INFORMATION

Map 1.4a/1.4b (onsite)

Soil Landscape

Soil Landscape	REet	ETTAMOGAH	Soil Group	RESIDUAL
Description	Landscape—71.1 km ² undulating plain on Silurian volcanics. Local relief 40–60 m; altitude 200–300 m; slopes 0–9%. Undulating low hills and rises with rounded crests and long gently inclined footslopes. Slopes are gentle and waxing. Drainage lines are widely spaced and poorly defined. Extensively cleared white box woodland. Soils—deep (1.0–1.5 m), well-drained Red Chromosols and Kurosols (Red Podzolic Soils) occur on crests, with deep (1.0–1.5 m), moderately well-drained Yellow Chromosols (Yellow Podzolic Soils) on slopes. Footslopes and drainage lines consist of deep (1.0–1.5 m), poorly drained Yellow Sodosols (Brown and Yellow Soloths and Solodic Soils). Limitations—high gully erosion risk; localised sodicity; localised poor drainage; seasonal waterlogging; moderate sheet erosion risk; localised ferromanganic and cultivation hardpans; potential discharge area; localised foundation hazard.			
Soil Landscape	SC	Sodosols	Soil Group	Solodic Soils
Description	GSG classification - See Solodised Solonetz and Solodic Soils.			
Soil Landscape	REm	Kandosols	Soil Group	Red Earths - less fertile (granites and metasediment)
Description	GSG classification - Massive, reddish sandy profiles with a gradual increase in clay content with depth.			

Soil Landscape	REet	ETTAMOGAH	Soil Group	RESIDUAL
Soil Landscape	YPI	Kurosols	Soil Group	Yellow Podzolic Soils - less fertile (granites and metasediment)
Description	GSG classification - Strongly differentiated duplex soils with light to medium textured A1 horizon over a pale A2 over a yellowish, firm to friable B horizon with generally polyhedral structure.			
Soil Landscape	RPI	Kurosols	Soil Group	Red Podzolic Soils - less fertile (granites and metasediment)
Description	GSG classification - Strongly differentiated duplex soils with light to medium textured A1 horizon over a pale or bleached A2 over a reddish, firm to friable B horizon with generally polyhedral structure.			

Salinity

Salinity Hazard	Low	Yes
	High	Yes

Radon

Radon Level	Bq/m ³	22
-------------	-------------------	----

Typical radon levels in Australia are low and the values shown are the average values for each census district. For specific location, factors such as the local geology and house type could lead to different values. (ARPANSA).

Acid Sulfate Soil

ASS Risk Map (Table 1.4.1)	On the Property?	Within Buffer?
Class	Not identified	Not identified

National Acid Sulfate Soils Atlas

Atlas of Australian ASS (Table 1.4.2)	An(p4)	ASS in inland lakes, waterways, wetlands and riparian zones	Probability of Occurrence	High Probability of occurrence
	Bn(p4)	ASS in inland lakes, waterways, wetlands and riparian zones		Low Probability of occurrence
	Cn(p4)	ASS in inland lakes, waterways, wetlands and riparian zones		Extremely low probability of occurrence

Table 1.4.1. Classification scheme in the ASS Planning Maps

Class of Land as shown on ASS Planning Maps	
1	Any works.
2a	Works below the natural ground surface. Works by which the watertable is likely to be lowered.
2b	Works other than ploughing below the natural ground surface. Works by which the watertable is likely to be lowered.
3	Works more than 1 metre below the natural ground surface. Works by which the watertable is likely to be lowered more than 1 metre below the natural ground surface.
4	Works more than 2 metres below the natural ground surface. Works by which the watertable is likely to be lowered more than 2 metres below the natural ground surface.

Table 1.4.1. Classification scheme in the ASS Planning Maps

5	Works within 500 metres of adjacent Class 1, 2a, 2b, 3 or 4 land that is below 5 metres Australian Height Datum and by which the watertable is likely to be lowered below 1 metre Australian Height Datum on adjacent Class 1, 2a, 2b, 3 or 4 land.
----------	---

For each class of land, the maps identify the type of works likely to present an environmental risk if undertaken in the particular class of land. If these types of works are proposed, further investigation is required to determine if ASS are actually present and whether they are present in such concentrations as to pose a risk to the environment.

Table 1.4.2. Atlas of Australian Acid Sulfate Soils¹ (ASRIS) (CSIRO/NatCASS)

Probability of Occurrence of ASS ¹	
A	High Probability of occurrence - (>70% chance of occurrence in mapping unit)
B	Low Probability of occurrence - (6-70% chance of occurrence in mapping unit)
C	Extremely low probability of occurrence - (1-5% chance of occurrence in mapping unit)
D	No probability of occurrence - (<1% chance of occurrence in mapping unit)
x	Disturbed ASS¹ terrain - (ASS ¹ material present below urban development).
u	Unclassified - (Insufficient information to classify map unit)
Zones	
a	Potential acid sulfate soil material and/or Monosulfidic Black Ooze (MBO).
b, c	Potential acid sulfate soil generally within upper 1 m.
c, d, e	ASS ¹ generally within upper 1 m.
f	ASS ¹ generally below 1 m from the surface
g	ASS ¹ , generally below 3 m from the surface.
h	ASS ¹ generally within 1 m of the surface.
i, j	ASS ¹ generally below 1 m of the surface.
k	ASS ¹ material and/or Monosulfidic Black Ooze (MBO).
l, m, n, o, p, q	ASS ¹ generally within upper 1 m in wet / riparian areas.
Subscripts to codes	
(a)	Actual acid sulfate soil (AASS) = sulfuric material.
(p)	Potential acid sulfate soil (PASS) = sulfidic material.
(q)	Monosulfidic Black Ooze (MBO) is organic ooze enriched by iron monosulfides.
Confidence levels	
(1)	All necessary analytical and morphological data are available
(2)	Analytical data are incomplete but are sufficient to classify the soil with a reasonable degree of confidence
(3)	No necessary analytical data are available, but confidence is fair, based on a knowledge of similar soils in similar environments
(4)	No necessary analytical data are available, and classifier has little knowledge or experience with ASS, hence classification is provisional

¹Acid Sulfate Soils (ASS) are all those soils in which sulfuric acid may be produced, is being produced, or has been produced in amounts that have a lasting effect on main soil characteristics (Pons 1973). Acid sulfate soil (ASS) may include PASS or AASS + PASS. Potential acid sulfate soil (PASS) = sulfidic material. Actual acid sulfate soil (AASS) = sulfuric material.

1.5 GEOLOGY AND TOPOGRAPHY

Map 1.5 (onsite)

Geology

Map Sheet	Code	Formation	Age	Group	Dominant Lithology	Description
Hume 1:50,000 Geological Map	Q_c	<Null>	Quaternary	Colluvium	Clastic sediment	Poorly sorted, weakly cemented to unconsolidated colluvial lenses of polymictic conglomerate with medium- to very coarse-grained sand matrix; interspersed with unconsolidated clayey and silty red-brown (aeolian) sand layers, modified by pedogenesis
Albury 1:50,000 Geological Sheet (VIC)						
Wagga Wagga 1:250 000 Metallogenic Map	Q_r	<Null>	Quaternary	Residual deposits	Saprolite	A weakly-consolidated regolithic residuum such as soil or saprolite mostly developed in-situ as a result of advanced weathering and/or pedogenesis.
Jerilderie 1:250,000 Geological Sheet - 2nd Edition						

Naturally Occurring Asbestos Potential (NOA)

Category	On the Property?	Within Buffer?
Not identified	-	-

Topography

Topography	220-300 mAHD
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Section 2 Hydrogeology



2.1 HYDROGEOLOGY AND GROUNDWATER BORES

Map 2.1 (2000m Buffer)

	On the Property?	Within Buffer?
Aquifer Type	Fractured or fissured, extensive aquifers of low to moderate productivity Porous, extensive highly productive aquifers	Fractured or fissured, extensive aquifers of low to moderate productivity Porous, extensive highly productive aquifers
Drinking Water Catchments	Not identified	Not identified
Protected Riparian Corridor	Eight Mile Creek	Eight Mile Creek Bungambrawatha Creek
UPSS Environmentally Sensitive Zone	Murray - Riverina	Murray - Riverina
Wetlands	Reservoir	Reservoir

Groundwater Bores

Map ID	Groundwater Bore ID	Authorised Purpose	Completion Date	Drilled Depth (m)	Final Depth (m)	SWL (m)	Salinity (mg/l)	Yield (L/s)	Distance (m)	Direction
1	GW070670	Unknown	24/03/1993	88.0	88.0	47.3	Good	0.017	0.0	Onsite
5	GW070669	Unknown	23/03/1993	88.0	88.0	45	Good	0.067	0.0	Onsite
8	GW505388	Monitoring	19/11/2007	24.0	24.0	<Null>	<Null>	<Null>	0.0	Onsite
14	GW504499	Household	3/05/2007	<Null>	132.0	40	<Null>	0.01	64.1	East
7	GW503809	Household	6/06/2006	90.0	90.0	40	<Null>	0.02	369.3	East
3	GW070671	Unknown	2/04/1993	98.0	98.0	45.03	Good	2	496.2	East
12	GW070672	Monitoring	15/12/1993	130.0	130.0	<Null>	<Null>	0.02	619.3	North

Map ID	Groundwater Bore ID	Authorised Purpose	Completion Date	Drilled Depth (m)	Final Depth (m)	SWL (m)	Salinity (mg/l)	Yield (L/s)	Distance (m)	Direction
9	GW070673	Monitoring	16/12/1993	103.0	103.0	<Null>	0-500 ppm	0.3	789.7	North-east
4	GW006584	Unknown	1/09/1939	97.8	97.8	<Null>	<Null>	<Null>	888.6	South
13	GW504761	Household	1/01/2012	<Null>	2.4	1	Excellent	1.03	935.0	West
11	GW067998	Household	1/01/1989	<Null>	60.0	<Null>	V.Salty	<Null>	1037.4	South
2	GW070668	Unknown	22/03/1993	60.0	60.0	46	Good	0.034	1044.6	North
10	GW065903	Household	12/04/1989	<Null>	44.0	13	501-1000 ppm	0.5	1433.0	West
6	GW503788	Monitoring	30/08/2006	20.0	20.0	<Null>	<Null>	<Null>	1655.4	South-west
15	GW505724	Null	N/A	<Null>	40.0	<Null>	<Null>	<Null>	1676.1	East

Groundwater Bores Driller Lithology Details

Groundwater Bore ID	From Depth – To Depth (m)	Lithology	Distance (m)	Direction
GW070670	0m-2.5m 2.5m-30m 30m-88m	Grey clay Brown red decomposed granite Hard grey granite bedrock	0.0	Onsite
GW070669	0m-32m 32m-46m 46m-88m	Pink brown grey decomposed granite Firm brown decomposed granite Hard grey granite bedrock	0.0	Onsite
GW505388	0m-0.4m 0.4m-2.4m 2.4m-3m 3m-10.5m 10.5m-24m	Fill, sandy gravel, white, grey, fine to coarse grained sand, fine to coarse grained gravel Clay, high plasticity, yellow, grey, traces of fine to coarse grained sand Sandy clay, medium plasticity, gre, fine to coarse grained sand Sandy clay, gravelly, medium plasticity, yellow, grey, fine to coarse grained sand, fine to coarse grained gravel Sandy clay, gravelly, medium plasticity, brown, red, fine to coarse grained gravel, fine to coarse grained sand	0.0	Onsite
GW504499	#N/A		64.1	East
GW503809	0m-20m 20m-49m 49m-55m 55m-90m	Clay grey Granite decomposed Granite fractured unstable Granite firm	369.3	East
GW070671	0m-1m 1m-6m 6m-17m 17m-20m 20m-28m 28m-50m 50m-82m 82m-98m	Grey clay Grey brown sandy clay Brown red sandy clay Firm yellow mudstone Red clay Soft brown sandy clay Brown decomposed granite Hard red grey sandstone	496.2	East
GW070672	#N/A		619.3	North
GW070673	#N/A		789.7	North-east
GW006584	0m-6.71m 6.71m-32.31m 32.31m-33.22m 33.22m-97.84m 33.22m-97.84m	Clay sandstone Slate Clay Mica fragments geologist Schist quartzite geologist	888.6	South
GW504761	#N/A		935.0	West
GW067998	#N/A		1037.4	South

Groundwater Bore ID	From Depth – To Depth (m)	Lithology	Distance (m)	Direction
GW070668	0m-2m Brown clay 2m-6m Grey clay 6m-40m Red grey clay 40m-50m Brown clay & quartz 50m-60m Brown decomposed granite		1044.6	North
GW065903	#N/A		1433.0	West
GW503788	0m-0.1m Concrete 0.1m-0.8m Fill: clayey sand, brown medium grained crushed rock <10mm minor organic matter low plasticity moist soil odour. 0.8m-4.2m Sandy clay brown with red and grey mottles fine to medium grained low plasticity moist soil odour 4.2m-7.9m Sandy clay red brown medium grained quartz gravels <20mm low plasticity moist soil odour 7.9m-12.4m Sandy clay red brown fine grained quartz gravels <20mm low plasticity moist soil odour 12.4m-20m Sandy clay red pink very fine grained minor silt dry soil odour		1655.4	South-west
GW505724	#N/A		1676.1	East

2.2 HYDROGEOLOGY AND OTHER BOREHOLES

Map 2.2 (500m Buffer)

	On the Property?	Within Buffer?
Groundwater Vulnerability	Not identified	Not identified
Groundwater Exclusion Zones ^{1,2}	Not identified	Not identified
Hydrogeologic Unit	Upper Tertiary/Quaternary Aquifer (porous media - unconsolidated) Palaeozoic and Pre-Cambrian Fractured Rock Aquifers (low permeability)	Upper Tertiary/Quaternary Aquifer (porous media - unconsolidated) Palaeozoic and Pre-Cambrian Fractured Rock Aquifers (low permeability)

¹ - Botany Groundwater Management Zones (BGMZ): Zone 1 - the use of groundwater remains banned; Zones 2 to 4 - domestic groundwater use is banned, especially for drinking water, watering gardens, washing windows and cars, bathing, or to fill swimming pools.

² - Williamstown Groundwater Management Zones (WGMZ): Primary Management Zone - this area has significantly higher levels of PFAS detected and therefore, the strongest advice applies. Secondary Management Zone - this area has some detected levels of PFAS; Broader Management Zone - the topography and hydrology of the area means PFAS detections could occur now and into the future.

Groundwater Dependent Ecosystems (GDE)

	On the Property?	Within Buffer?
Aquatic	High potential	High potential
Terrestrial	High - low potential	High - low potential

Aquatic - Ecosystems that rely on the Surface expression of groundwater.

Terrestrial - Ecosystems that rely on the Subsurface expression of groundwater.

Other Known Borehole Investigations (Coal Seam Gas (CSG), Petroleum Wells and Other Boreholes)

Borehole ID	Purpose	Project	Client/ Licence	Date Drilled	Depth (m)	Distance (m)	Direction
Not identified	-	-	-	-	-	-	-



Section 3 Environmental Registers, Licences and Incidents



3.1 CONTAMINATED LAND PUBLIC REGISTER

Map 3.1 (1000m Buffer)

Sites Notified as Contaminated to the EPA

Site Name	Address	Activity that caused Contamination	EPA Site Management Class (Table 3.1.1)	Distance (m)	Direction
Not identified	-	-	-	-	-

If the record does not contain a complete street address and/or cannot be located, the records' geographic location will be approximated and reported as being within the surrounding area.

Contaminated Land Record of Notices

Site Name	Area n°	Address	Notices	Distance (m)	Direction
Not identified	-	-	-	-	-

If the record does not contain a complete street address and/or cannot be located, the records' geographic location will be approximated and reported as being within the surrounding area.

Table 3.1.1. EPA Site Management Class Explanation

Table 3.1.1 EPA Site Management Class	
EPA Site Management Class	
Under Assessment	The contamination is being assessed by the EPA to determine whether regulation is required. The EPA may require further information to complete the assessment. For example, the completion of management actions regulated under the planning process or Protection of the Environment Operations Act 1997. Alternatively, the EPA may require information via a notice issued under s77 of the Contaminated Land Management Act 1997 or issue a Preliminary Investigation Order.
Regulation under the CLM Act not required	The EPA has completed an assessment of the contamination and decided that regulation under the Contaminated Land Management Act 1997 is not required.

Table 3.1.1 EPA Site Management Class

Regulation being finalised	The EPA has completed an assessment of the contamination and decided that the contamination is significant enough to warrant regulation under the Contaminated Land Management Act 1997. A regulatory approach is being finalised.
Contamination currently regulated under the CLM Act	The EPA has completed an assessment of the contamination and decided that the contamination is significant enough to warrant regulation under the Contaminated Land Management Act 1997 (CLM Act). Management of the contamination is regulated by the EPA under the CLM Act. Regulatory notices are available on the EPA's Contaminated Land Public Record.
Contamination currently regulated under the POEO Act	The EPA has completed an assessment of the contamination and decided that the contamination is significant enough to warrant regulation. Management of the contamination is regulated under the Protection of the Environment Operations Act 1997 (POEO Act). The EPA's regulatory actions under the POEO Act are available on the POEO public register.
Contamination being managed via the planning process (EP&A Act)	The EPA has completed an assessment of the contamination and decided that the contamination is significant enough to warrant regulation. The contamination of this site is managed by the consent authority under the Environmental Planning and Assessment Act 1979 (EP&A Act) planning approval process, with EPA involvement as necessary to ensure significant contamination is adequately addressed. The consent authority is typically a local council or the Department of Planning and Environment.
Contamination formerly regulated under the CLM Act	The EPA has determined that the contamination is no longer significant enough to warrant regulation under the Contaminated Land Management Act 1997 (CLM Act). The contamination was addressed under the CLM Act.
Contamination formerly regulated under the POEO Act	The EPA has determined that the contamination is no longer significant enough to warrant regulation. The contamination was addressed by the appropriate consent authority via the planning process under the Environmental Planning and Assessment Act 1979 (EP&A Act).
Contamination was addressed via the planning process (EP&A Act)	The EPA has determined that the contamination is no longer significant enough to warrant regulation. The contamination was addressed by the appropriate consent authority via the planning process under the Environmental Planning and Assessment Act 1979 (EP&A Act).
Ongoing maintenance required to manage residual contamination (CLM Act)	The EPA has determined that ongoing maintenance, under the Contaminated Land Management Act 1997 (CLM Act), is required to manage the residual contamination. Regulatory notices under the CLM Act are available on the EPA's Contaminated Land Public Record.

The EPA maintains a record of sites that have been notified to the EPA by owners or occupiers as contaminated land. The sites notified to the EPA are recorded on the register at various stages of the assessment and/or remediation process.

3.2 SITES REGULATED BY OTHER JURISDICTIONAL BODY

Map 3.2 (2000m Buffer)

Defence, Military Sites and UXO Areas

Site name	Type*	Details	Distance (m)	Direction
Ettamogah	Unexploded Ordnance (UXO)	Potential presence of UXO = Substantial Potential This site was part of an Ammunition Depot from WWII to 1982. [Source: Department of Defence Australian Government] The former military installation of RAAF Ettamogah was located in Ettamogah along Central Reserve Road off the Olympic Way at One Tree Hill. In 1926, the surrounding farms were purchased by the Australian Defence Department for development into an airfield and military installations. During 1942, an ammunition depot was established by the Royal Australian Air Force (RAAF) on 110 hectares area at Ettamogah. Operated by the RAAF. In 1961, handed over to the Australian Army's 311 Supply Company. In 1982, the ordnance depot was closed with all munitions removed by 1990	5	South-east
Tabletop	Unexploded Ordnance (UXO)	Potential presence of UXO = Slight potential This site was used as a Artillery Range	1390	North-east

Site name	Type*	Details	Distance (m)	Direction
		during WWII. [Source: Department of Defence Australian Government]		

*RCIP (Regional Contamination Investigation Program). UXO (Unexploded Ordnance Areas)

Former Gasworks Sites

Site name	Description	Distance (m)	Direction
Not identified	-	-	-

PFAS Sites

Site name	Description	Source	Distance (m) *	Direction
Not identified	-	-	-	-

National Pollutant Inventory (NPI)

Facility name	Address	Primary ANZSIC Class	Latest report	Distance (m)	Direction
Norske Skog Albury Papermill	117 RW Henry Drive, Ettamogah	Pulp, Paper and Paperboard Manufacturing	2018/2019	0	Onsite
Overall Forge	70 R W Henry Drive, Ettamogah	Iron and Steel Forging	2018/2019	0	Onsite
DSI Holdings Pty Limited	Kaitlers Road, Lavington	Other Motor Vehicle Parts Manufacturing	2013/2014	1288	South

3.3 LICENCES, APPROVALS & NOTICES

Map 3.3 (500m Buffer)

Licences

Licence N°	Licence holder	Location Name	Premise Address	Fee Based Activity	Distance (m)*	Direction
21519	CIRCULAR PLASTICS AUSTRALIA (PET) PTY LTD	Circular Plastics Australia (PET) Pty Ltd CORNER OF KNOWLES ROAD AND MCLAURIN ROAD, ETTAMOGAH, NSW, 2640	Circular Plastics Australia (PET) Pty Ltd CORNER OF KNOWLES ROAD AND MCLAURIN ROAD, ETTAMOGAH, NSW, 2640	Waste storage - other types of waste Chemical storage waste generation Recovery of general waste	0	Onsite
1272	VISY ALBURY PTY LTD	MARYVALE AND ROSEDALE	MARYVALE AND ROSEDALE, ETTAMOGAH	Dangerous goods production Paper or pulp production Dangerous goods production Paper or pulp production	0	Onsite
10069	A P DELANEY & CO PTY LTD	WINCHESTER LANE	WINCHESTER LANE, TABLE TOP	Crushing, grinding or separating Extractive activities Waste disposal by application to land	0	Onsite
1954	BURGESS EARTHMOVING PTY LTD	OLYMPIC WAY - ETTAMOGAH VIA	OLYMPIC WAY - ETTAMOGAH VIA, ALBURY	Crushing, grinding or separating Extractive activities	0 (adjacent)	West
13233	BURGESS EARTHMOVING PTY LTD	OLYMPIC WAY	OLYMPIC WAY, WAGGA WAGGA	Extractive activities	0 (adjacent)	West

If the record does not contain a complete street address and/or cannot be located, the records' geographic location will be approximated and reported as being within the surrounding area.

Other Licences still Regulated by EPA

Licence N°	Licence holder	Location Name	Premise Address	Fee Based Activity	Status	Distance (m)*	Direction
13419	FORESTRY CORPORATION OF NEW SOUTH WALES Trading as: FORESTRY CORPORATION	IFOA AREA "SOUTH-WESTERN CYPRESS REGION"	STATE FORESTS AND OTHER CROWN-TIMBER LANDS WITHIN THE SOUTH-WESTERN AREA , DUBBO, NSW, 2830	Logging operations	No longer in force	0	Not mapped

If the record does not contain a complete street address and/or cannot be located, the records' geographic location will be approximated and reported as being within the surrounding area.

Clean Up and Penalty Notices

Location ID	Notice Type	Notice N°	Licence holder	Location Name	Premise Address	Distance (m)*	Direction
290	Penalty Notice	1518944	BURGESS EARTHMOVING PTY LTD	BURGESS QUARRY	OLYMPIC WAY, WAGGA WAGGA, NSW, 2650,	0 (adjacent)	West

If the record does not contain a complete street address and/or cannot be located, the records' geographic location will be approximated and reported as being within the surrounding area.



Section 4 Potentially Contaminated Areas



4.1 FORMER POTENTIALLY CONTAMINATED LAND

Map 4.1 (500m Buffer)

Contaminated Legacy Areas / Historic Incident Sites

Site Name	Description	Distance (m)	Direction
Not identified	-	-	-

Includes known contaminated areas such as James Hardies Asbestos waste legacy areas, Pasmenco Smelter and Uranium processing site.

Derelict Mines and Quarries

Site name	Description	Distance (m)	Direction
Ettamogah / Potential Brick Clay Resource	Locality 10 in GS1974/021 based on data from P Evans who undertook exploration under Els for Albury Brickworks. Data from GS1974/190 (exploration reportsd for Els 652, 653) is very sparse suggesting locations in GS1974/021 were provided directly by P Eva	0	Onsite
Potential Clay/shale Resource	Potential clay/shale resource 19 (lesser quality) identified by P Evans of Albrick P/L (GS1974/190, GS1974/021).	0	Onsite
Gun Club Pit / Olympic Way (Rockwood 3) / Nine Mile Hill	Granite extraction of 12,000m3 over 42 months from 18/6/99 to 18/12/02 by McGeoch & Stitz. Information supplied by Albury Council.	0	Onsite
Wards Pit / Central Reserve Road, Ettamogah	Mainly granite, basalt from veins only. Land owned by Albury-Wadonga Development Corporation. Development consent granted 7/9/95, reissued in 1/8/90 for an unspecified period. 113,000 m3pa limit on production. No production recorded since 1993-94. N	10	West
Unnamed Pit	DMR proposed pit (in 1974) for road materials (GS1974/021)	280	South-west

Historical Landfills

Site name	Description	Distance (m)	Direction
Not identified	-	-	-

4.2 CURRENT POTENTIALLY CONTAMINATING ACTIVITIES (PCA)

Map 4.2 (500m Buffer)

Industries, businesses and activities that may cause contamination

Site name	Category	Location	Status*	Distance (m)	Direction
Australian Newsprint Mills	Substation/Switching Stations	Ettamogah, NSW	Operational	0	Onsite
Burgess Quarry	Operating Mines	OLYMPIC WAY, WAGGA WAGGA, NSW, 2650,	Operational	0 (adjacent)	West

*Status:

Data is current as when this report was created. However due to the turnover of business locations, some addresses may be former.

Current: business is operating on the day this report was issued.

Former: business that have been closed or discontinued 1 to 2 years prior from the day this report was issued. All former sites older than 2 years will be reported in the 'Historical Potentially Contaminating Activities' section 4.4 in this report.

Included in this search:

Type	Type	Type
Cattle Dip Sites	Liquid Fuel Depots	Substation/Switching Stations
Dry Cleaners	Operating Mines	Telephone Exchanges
Fire Rescue	Power Stations	Wastewater Treatment Plants
Gas Terminals	Petrol Stations	Waste Management Facilities

Includes industries or business activities associated with potentially contaminating activities. Records identified within section 4.2 are considered to have a higher likelihood of contamination risk associated with the type of business activity. The contamination risk associated with these records is based solely on the type of activity undertaken by the business, and in conjunction with business activities deemed to be of moderate to high risk of potential contamination identified in State Government regulatory body (EPA) published regulations or guidelines.

The records identified have not been risk ranked based on any current or previous site inspection. Please note that records not identified within this section (due to error or unforeseen omission) does not necessarily mean that the screened area is not potentially contaminated or free of any risks.

4.3 OTHER POTENTIALLY CONTAMINATING ACTIVITIES

Map 4.3 (200m Buffer)

Industries, businesses and activities that may cause contamination considered of lesser risk

Site name	Category	Location	Status*	Distance (m)	Direction
Visy	Manufacturing	117 R W Henry Dr, Ettamogah NSW 2640	Operational	0	Onsite
Overall Forge	Steel Distributor	70 RW Henry Dr, Ettamogah NSW 2640	Operational	0	Onsite
Rod's Chassis Repairs Pty Ltd	Truck repair shop	Henshaw Ct, Springdale Heights NSW 2641	Operational	50	South

*Status:

Data is current as when this report was created. However due to the turnover of business locations, some addresses may be former.

Current: business is operating on the day this report was issued.

Former: business that have been closed or discontinued 1 to 2 years prior from the day this report was issued. All former sites older than 2 years will be reported in the 'Historical Potentially Contaminating Activities' section 4.4 in this report.

Includes industries or business activities records associated with potentially contaminating activities that are not listed in section 4.2 of this report. Records identified within this section are considered to have a lesser likelihood of contamination risk associated with the type of business activity. The contamination risk associated with the records listed in this section are based solely on the type of activity undertaken and have not been risk ranked based on any current or previous site inspection, as such, some of the sites listed in section 4.3 can be potentially of high risk. Industries or business activities deemed of a negligible risk of contamination are not reported. Please note that any record not identified within this section (due to error or unforeseen omission) does not necessarily mean that the screened area is not potentially contaminated or free of any risks.

4.4 HISTORICAL POTENTIALLY CONTAMINATING ACTIVITIES

(not mapped)

1930 Historical Business Data

Activity	Name	Address	Positional accuracy ¹	Distance (m)	Direction
Not identified	-	-	-	-	-

1940 Historical Business Data

Activity	Name	Address	Positional accuracy ¹	Distance (m)	Direction
Not identified	-	-	-	-	-

1950 Historical Business Data

Activity	Name	Address	Positional accuracy ¹	Distance (m)	Direction
Not identified	-	-	-	-	-

1965 Historical Business Data

Activity	Name	Address	Positional accuracy ¹	Distance (m)	Direction
Not identified	-	-	-	-	-

1970 Historical Business Data

Activity	Name	Address	Positional accuracy ¹	Distance (m)	Direction
Not identified	-	-	-	-	-

1980 Historical Business Data

Activity	Name	Address	Positional accuracy ¹	Distance (m)	Direction
Not identified	-	-	-	-	-

1990 Historical Business Data

Activity	Name	Address	Positional accuracy	Distance (m)	Direction
Earth Moving &/Or Excavating Contractors	Stuart John	Central Reserve Road, Lavington,NSW	Street		South

2005 Historical Business Data

Activity	Name	Address	Positional accuracy	Distance (m)	Direction
Forgings	Overall Forge Pty Ltd	Lot 7 R W Henry Drv, ETTAMOGAH,NSW,2640	Address	0.0	Onsite
Kitchens Renovations & Equipment- New	Ettamogah Enamelling	Lot 51 Central Reserve Rd, ETTAMOGAH,NSW,2640	Address	68.2	South
Gas Appliances & Equipment New & Reconditioned	Stuart John F - Plumber	3 Central Reserve Rd, ETTAMOGAH,NSW,2640	Address	68.2	South
Hot Water Systems Sales Installation & Repairs	Stuart John F. - Plumber	3 Central Reserve Rd, ETTAMOGAH,NSW,2640	Address	68.2	South

Activity	Name	Address	Positional accuracy	Distance (m)	Direction
Plumbers & Gasfitters	John F. Stuart	3 Central Reserve Rd, ETTAMOGAH,NSW,2640	Address	68.2	South
Graziers	John F. Stuart Plumbing	3 Central Reserve Rd, ETTAMOGAH,NSW,2640	Address	68.2	South

2010 Historical Business Data

Activity	Name	Address	Positional accuracy	Distance (m)	Direction
Forgings	Overall Forge Pty Ltd	Lot 7 R W Henry Drv ETTAMOGAH 2640 NSW	Address	0.0	Onsite
Building Contractors - Renovations Alterations & Extensions	Ettamogah Enamelling	Lot 51 Central Reserve Rd ETTAMOGAH 2640 NSW	Address	68.2	South

2015 Historical Business Data

Activity	Name	Address	Positional accuracy	Distance (m)	Direction
Engineers - Motor & Repairers	Ultra Tune Auto Service Centres	373A Wagga Rd, Albury,NSW,2640	Address	0.0	Onsite
Forgings	Overall Forge Pty Ltd	Lot 7 R W Henry Drv, Ettamogah,NSW,2640	Address	0.0	Onsite
Paper Merchants	Norske Skog Paper Mills (Australia) Limited	117 R.W. Henry Drv, Ettamogah,NSW,2640	Address	0.0	Onsite
Carriers - Heavy Industrial Transportation	Ettamogah Rail Hub	Lot 1 Hub Rd, Ettamogah,NSW,2640	Address	0.0	Onsite
Cabinetry Makers	Ettamogah Enamelling	Lot 51 Central Reserve Rd, Ettamogah,NSW,2640	Address	7.3	South
Zoos Animal Parks & Sanctuaries	Oz.e. Wildlife	Wagga Rd, Ettamogah,NSW,2640	Street		Onsite

Land Insight uses a number of address geocoding techniques and characterised them according to the following criteria: completeness (match rates) and positional accuracy. When a historical street address does not contain complete details or a match is not found, a record identified as being in the surrounding area will be included for reference and the accuracy of the data is approximate only. The positional accuracy of the records is listed below:

Historical data positional accuracy and georeferencing results explanation		
Positional accuracy	Georeferenced	Description
Address	Located to the address level	<i>When street address and names fully match.</i>
Street	Located to the street centroid	<i>When street names match but no exact address was found. Location is approximate.</i>
Place	Located to the structure, building or complex	<i>When building, residential complex or structure name match but no exact address was found. Location is approximate.</i>
Suburb	Located to the suburb area	<i>When suburb name match but no exact address was found. Location is approximate.</i>

The data used in this section was extracted from range of historical commercial trade directories and historical business listing information. The business addresses were geocoded using historical information and cannot be relied upon as some of the addresses no longer exist. From 2005, the historical business records in this section are considered more accurate as information was extracted from digital directories with geographic coordinate location information available. For more information on how these records were geocoded and the methodology used by Land Insight, contact us at info@landinsight.co.

Historical Industries or business activities deemed to be of negligible or lesser risk are not reported. Please note that any record not identified within this section (due to error or unforeseen omission) does not necessarily mean that the screened area is not potentially contaminated or free of any risks.



Section 5 Natural Hazards



5.1 Natural Hazards

Map 5.1 (500m Buffer)

Erosion Risk

Category	On the Property?	Within Buffer?
High	Yes	Yes

Fire Hazard

Category	On the Property?	Within Buffer?
Bush Fire Prone Land (BLP)	Buffer, 1, 2	Buffer, 1, 2
Fire History	-	-

Flood Hazard

Category	On the Property?	Within Buffer?
Not identified	-	-



Tower Three, Level 24
300 Barangaroo Avenue
Sydney NSW 2000 Australia
02 8067 8870
info@liresources.com.au
www.liresources.com.au

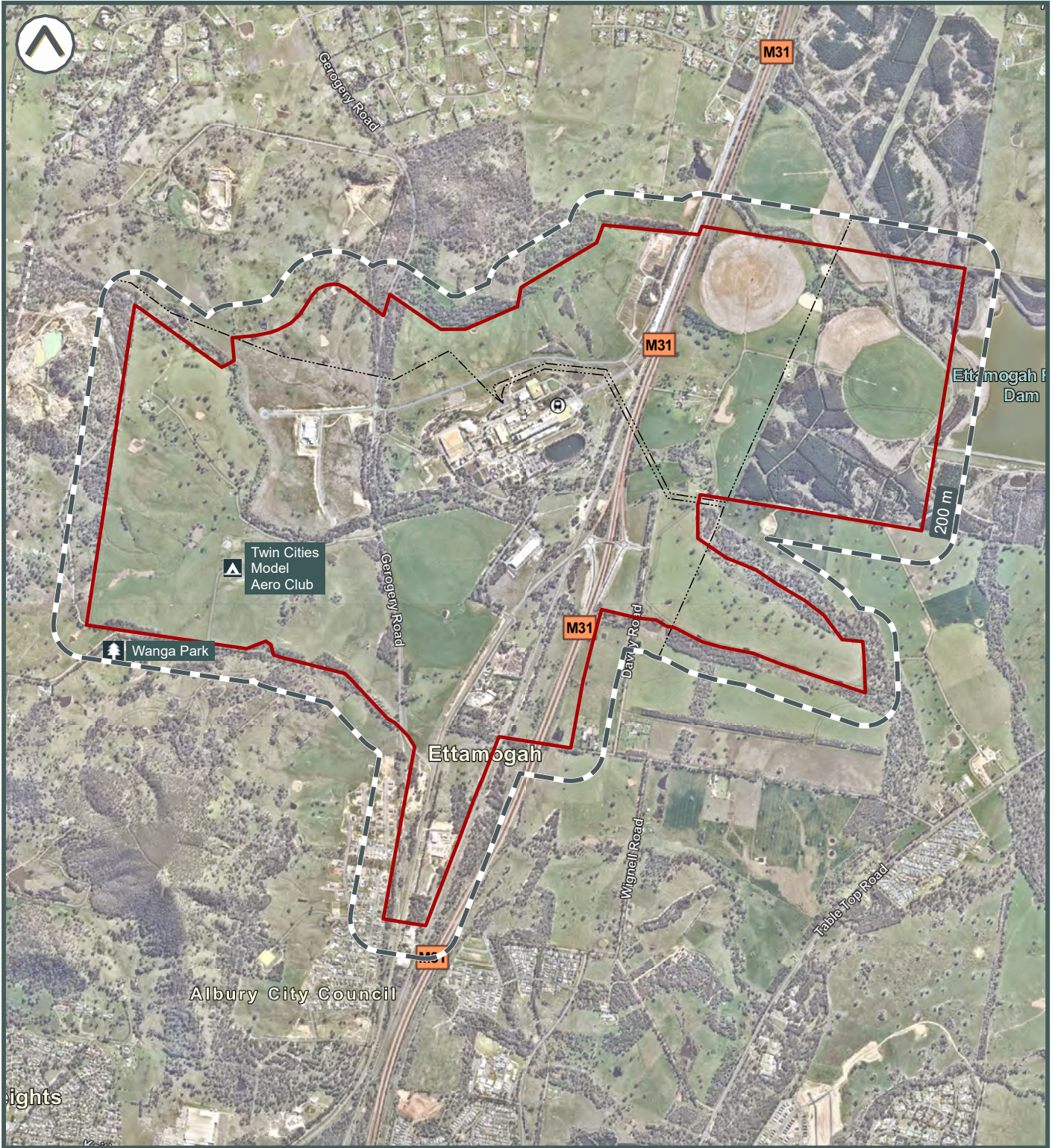


Appendix A

REPORT MAPS

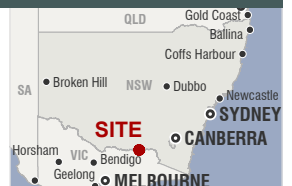


Subject Area and Sensitive Receptors



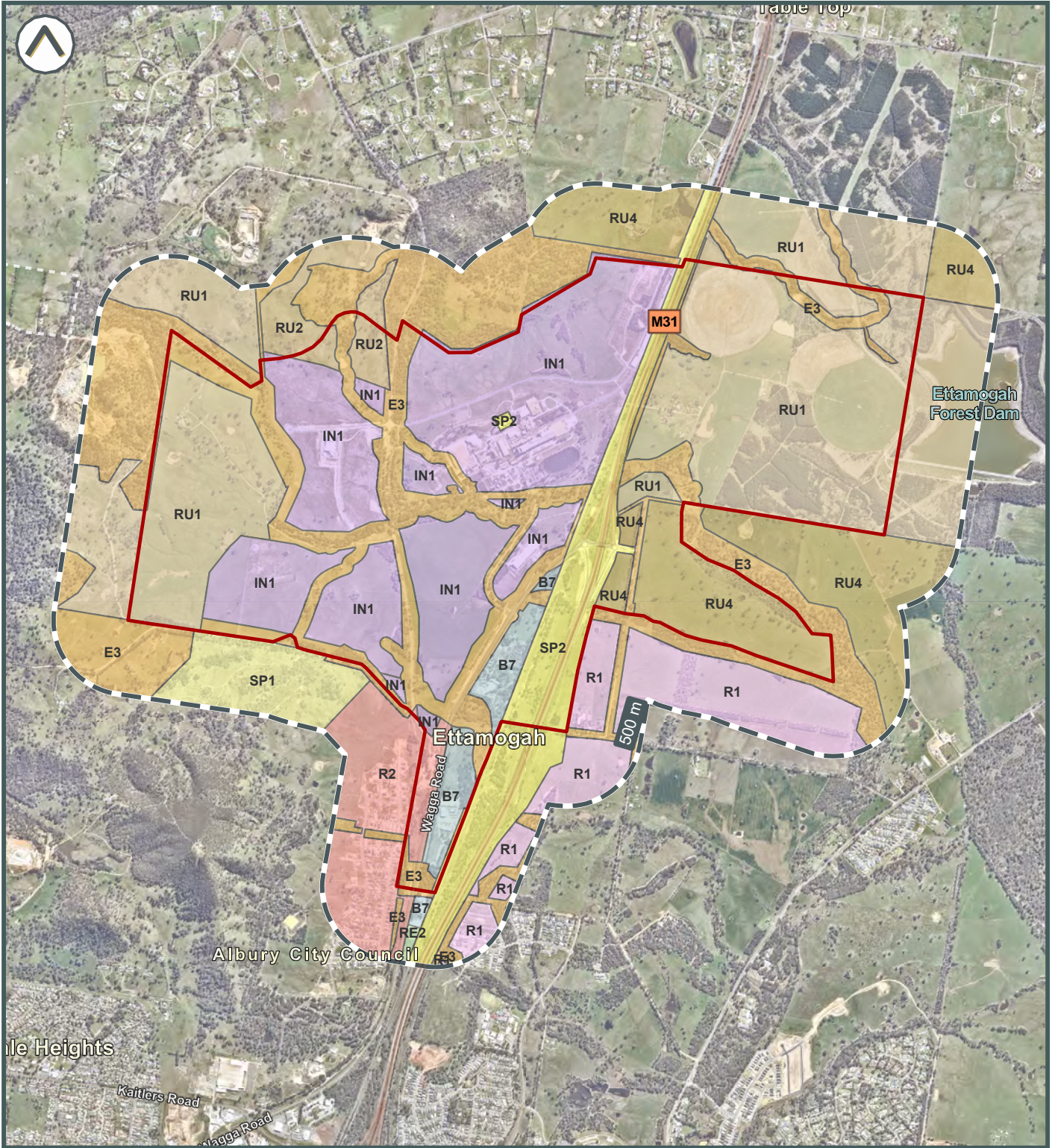
© 2021 Land Insight (LI) www.landinsight.co | 17/11/2021 | Data source: Please refer to 'Digital Data Sources' in the Product Guide

- Subject area
- Transmission line
- Parks
- Sports and Recreation Activities





Planning Controls

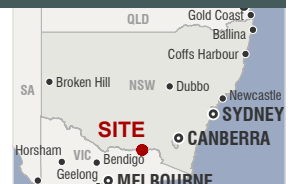


©2021 Land Insight (LI) www.landinsight.co | 17/11/2021 | Data source: Please refer to 'Digital Data Sources' in the Product Guide

- Subject area
- B7 | Business Park
- E3 | Environmental Management
- IN1 | General Industrial
- R1 | General Residential
- R2 | Low Density Residential
- RE2 | Private Recreation
- RU1 | Primary Production
- RU2 | Rural Landscape Zone
- RU4 | Rural Small Holdings
- SP1 | Special Activities
- SP2 | Special Purposes Zone - Infrastructure

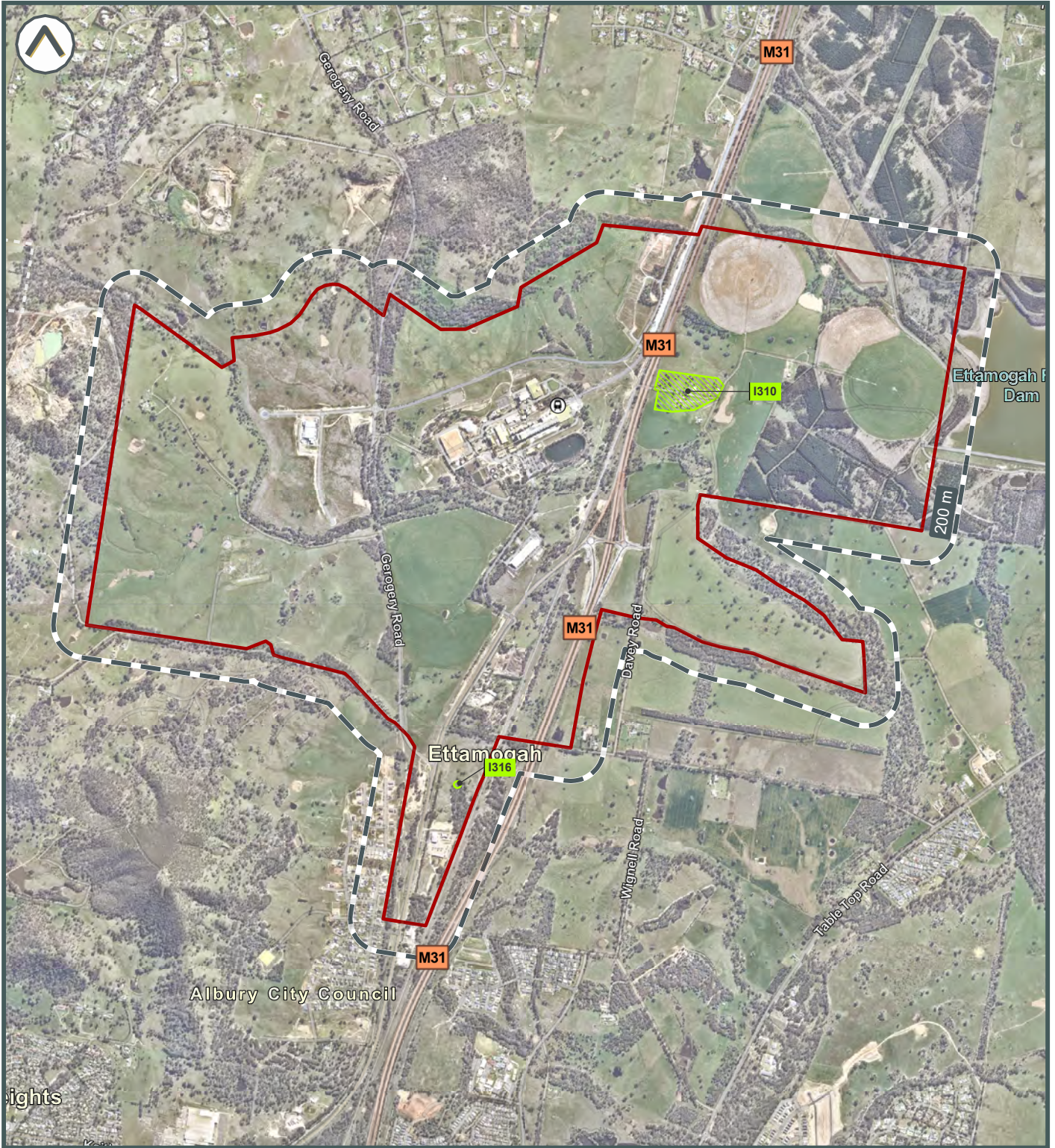


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Heritage

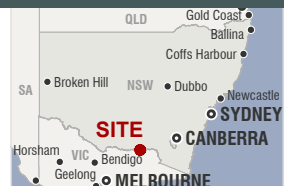


© 2021 Land Insight (LI) www.landinsight.co | 17/11/2021 | Data source: Please refer to 'Digital Data Sources' in the Product Guide

- Subject area
- Heritage conservation Area (LEP)
- 200 m
- State Heritage Register
- Commonwealth Heritage List (CHL)
- National Heritage List (NHL)
- World Heritage Area (WHA)

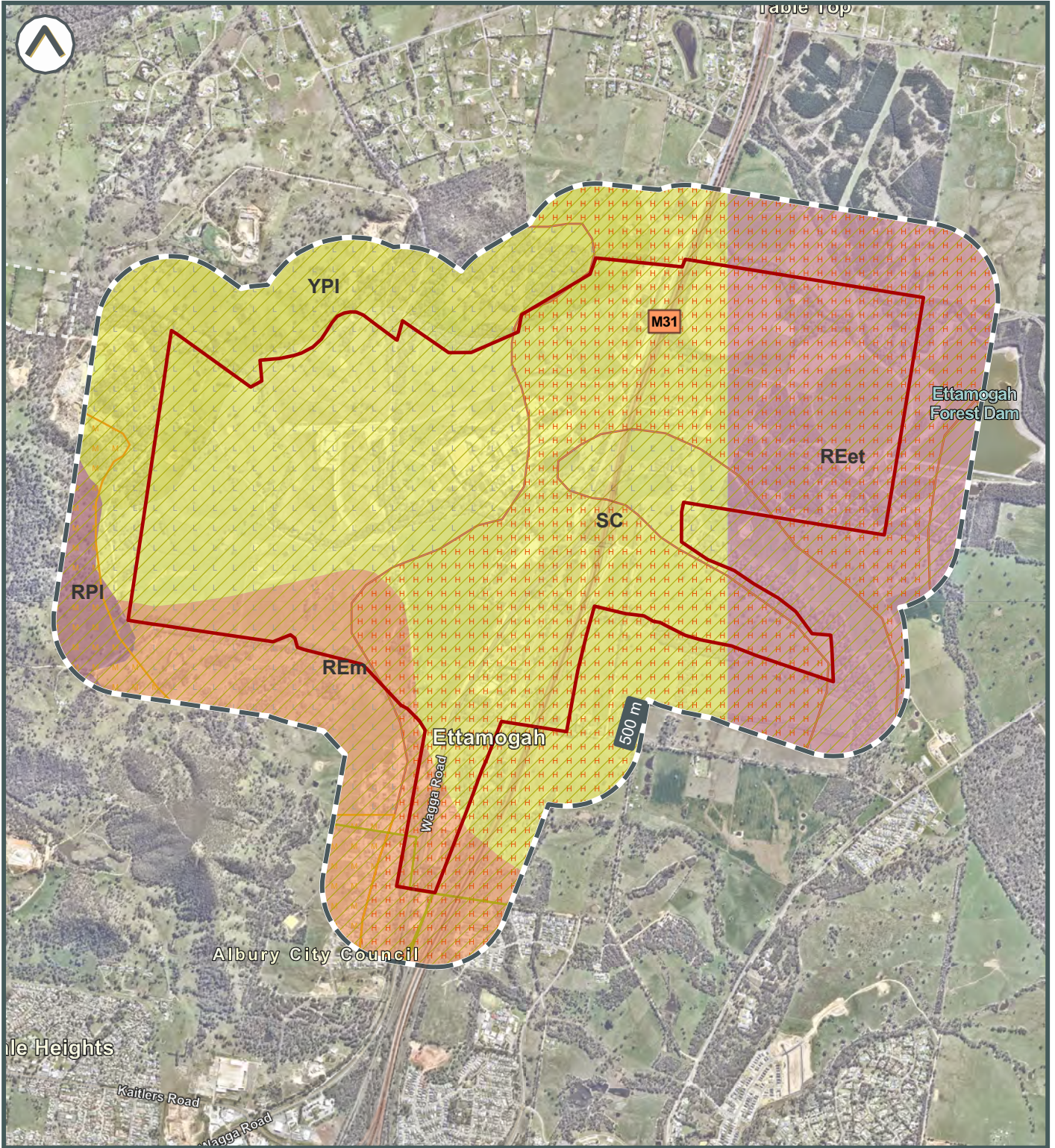


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Soil Landscape and Salinity

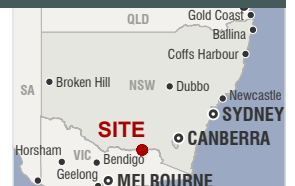


©2021 Land Insight (LI) www.landinsight.co | 17/11/2021 | Data source: Please refer to 'Digital Data Sources' in the Product Guide

- Subject area
- High
- Low
- Moderate
- Radon Level (Bq/m3)
- 20-24
- REet | RESIDUAL
- Dominant Great Soil Group (GSG)**
- Red Earths - less fertile (granites and metasediment); Red Earths - more fertile (volcanics and granodiorites) (REM)
- Red Podzolic Soils - less fertile (granites and metasediment) (RPI)
- Solodic Soils (SC)
- Yellow Podzolic Soils -less fertile (granites and metasediments) (YPI)

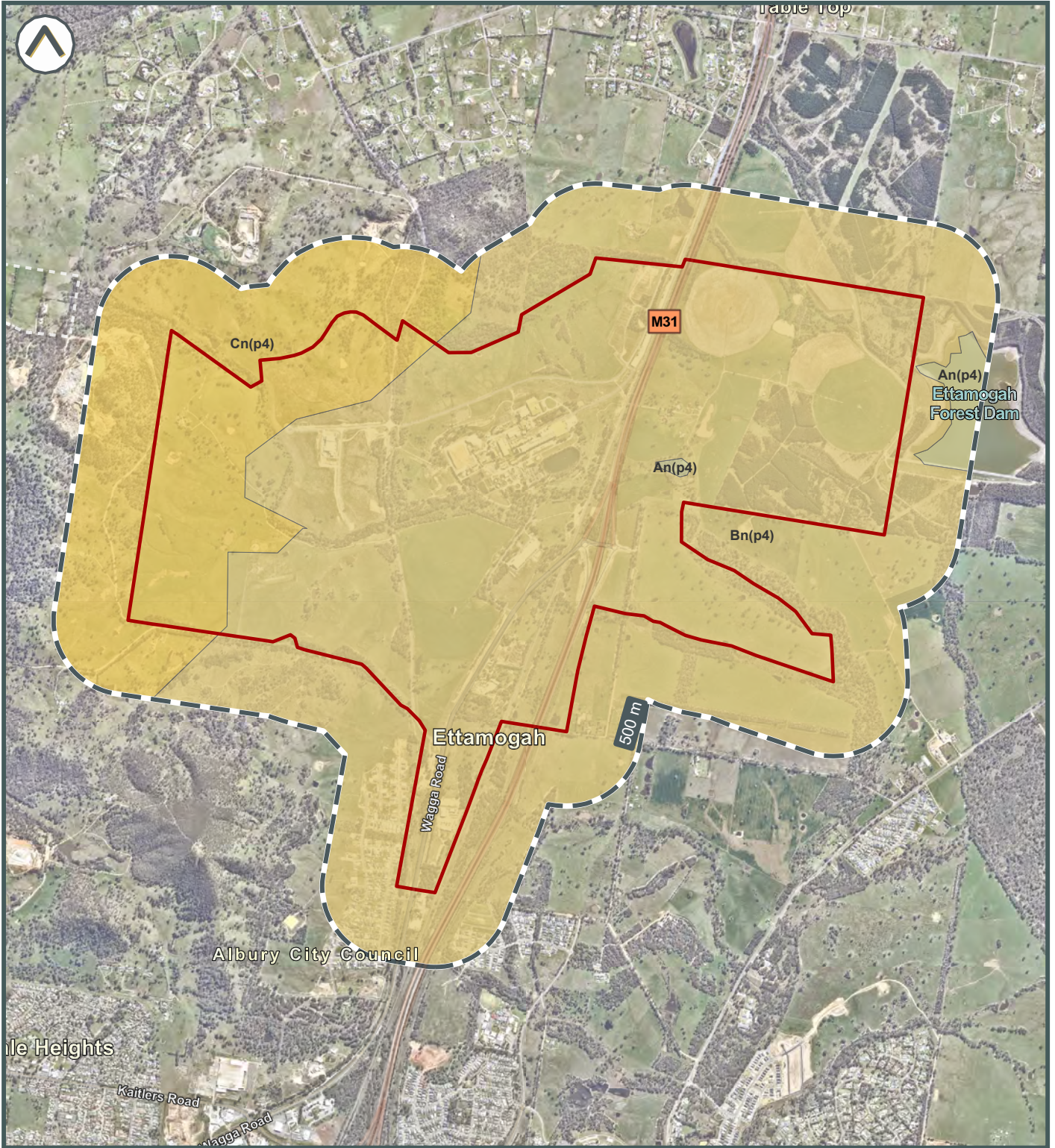


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Acid Sulfate Soils

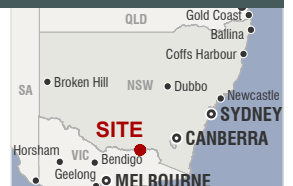


©2021 Land Insight (LI) www.landinsight.co | 17/11/2021 | Data source: Please refer to 'Digital Data Sources' in the Product Guide

- Subject area
- ASRIS Atlas of Australian Sulfate Soils**
- An(p4) | ASS in inland lakes, waterways, wetlands and riparian zones
- Bn(p4) | ASS in inland lakes, waterways, wetlands and riparian zones
- Cn(p4) | ASS in inland lakes, waterways, wetlands and riparian zones

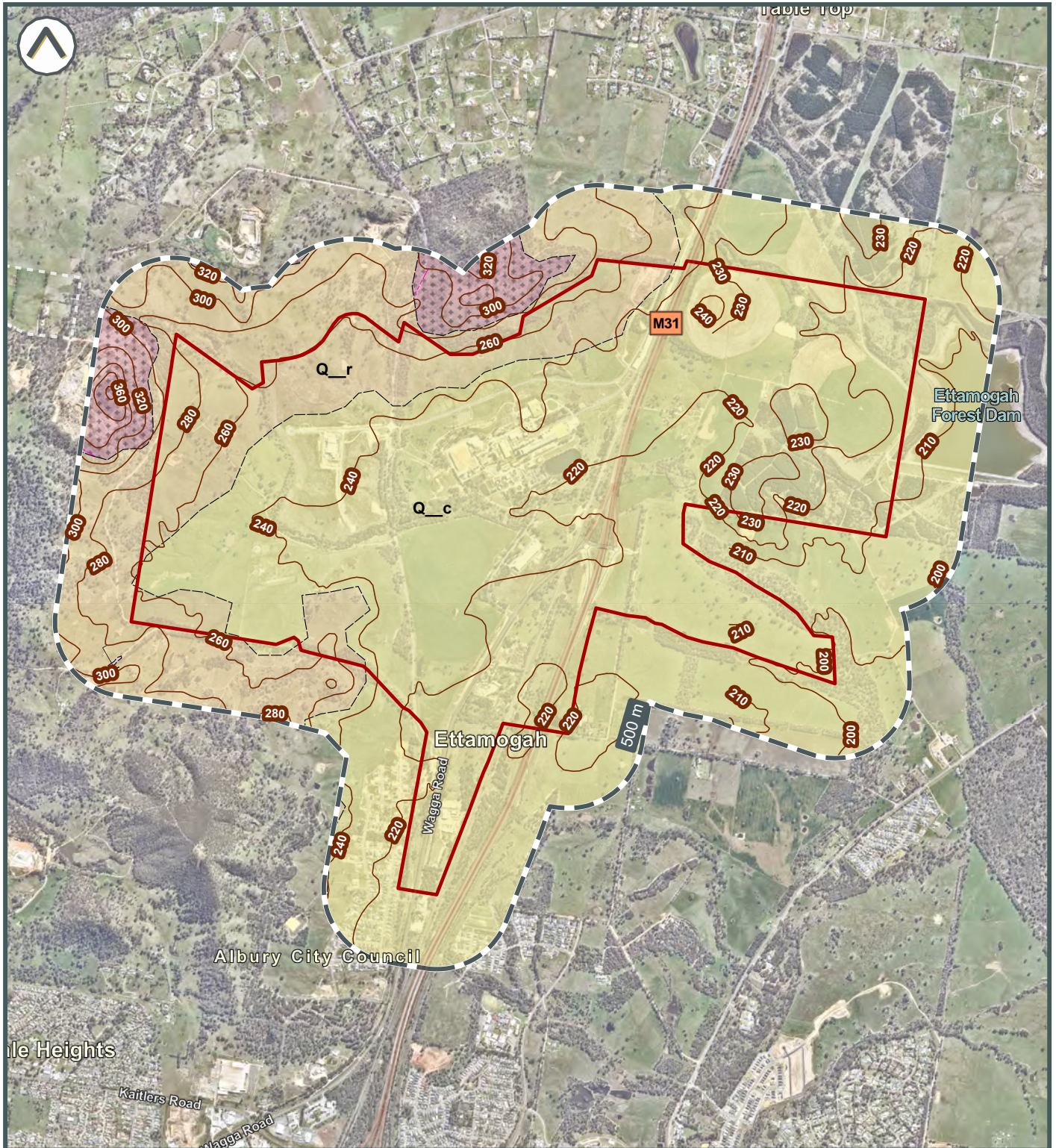


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Geology and Topography



©2021 Land Insight (LI) www.landinsight.co | 18/11/2021 | Data source: Please refer to 'Digital Data Sources' in the Product Guide

- Subject area
- Topographic contour (m)
- Strike and dip of cleavage
- Lineament interpreted from geophysical data

- | | | |
|--|---|--|
| <p>Dominant Lithology</p> <p>♦♦♦♦ Granite</p> | <p>Cenozoic Sedimentary Province</p> <p>Q_c</p> <p>Q_r</p> | <p>LACHLAN OROGEN</p> <p>Durj</p> <p>Oada</p> |
|--|---|--|

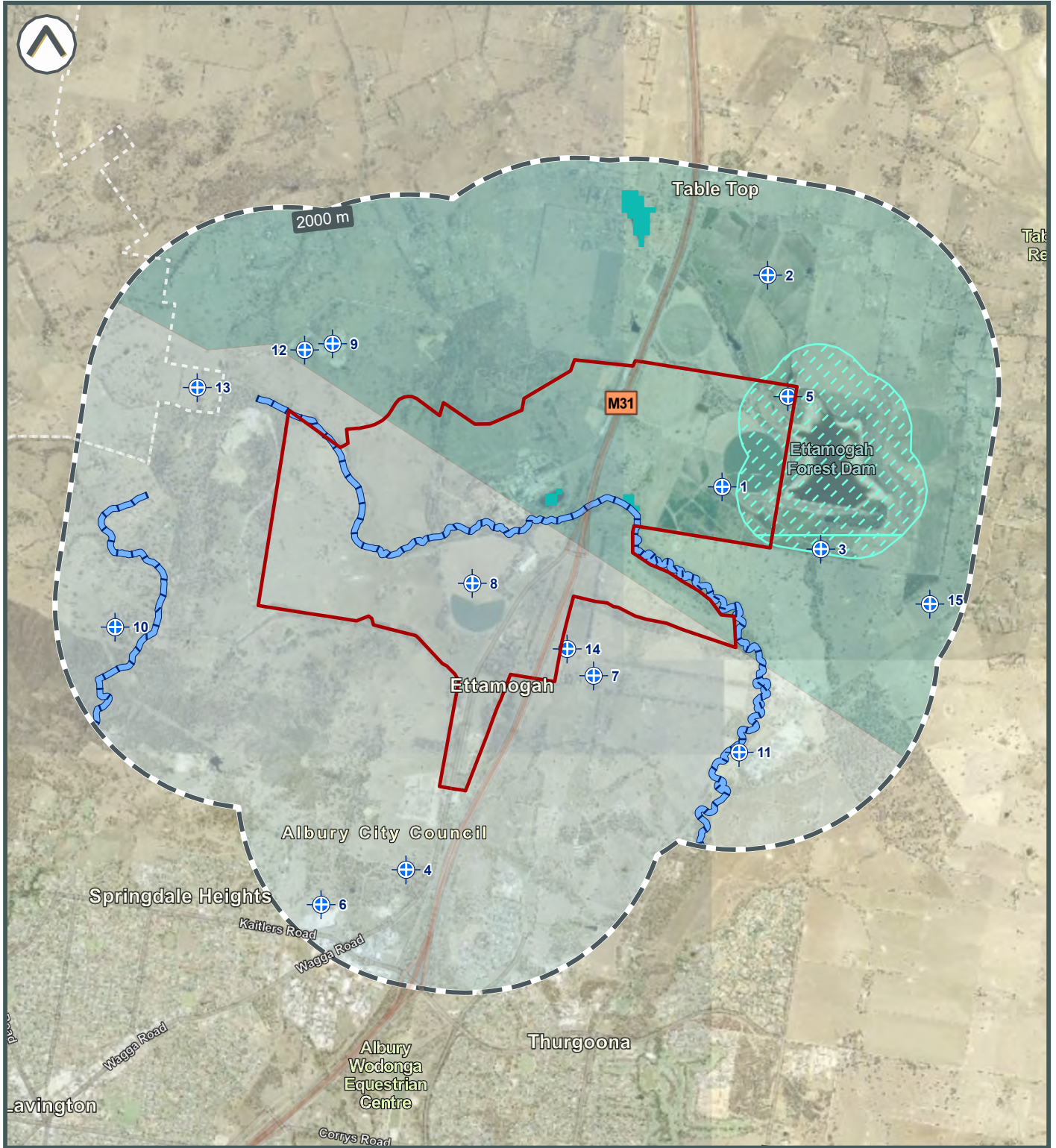


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Hydrogeology and Groundwater Boreholes



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- Subject area
- + Groundwater bores
- Protected Riparian Corridor
- UPSS Environmentally Sensitive Zone
- Wetlands
- Aquifer type**
- Fractured or fissured, extensive aquifers of low to moderate productivity
- Porous, extensive highly productive aquifers

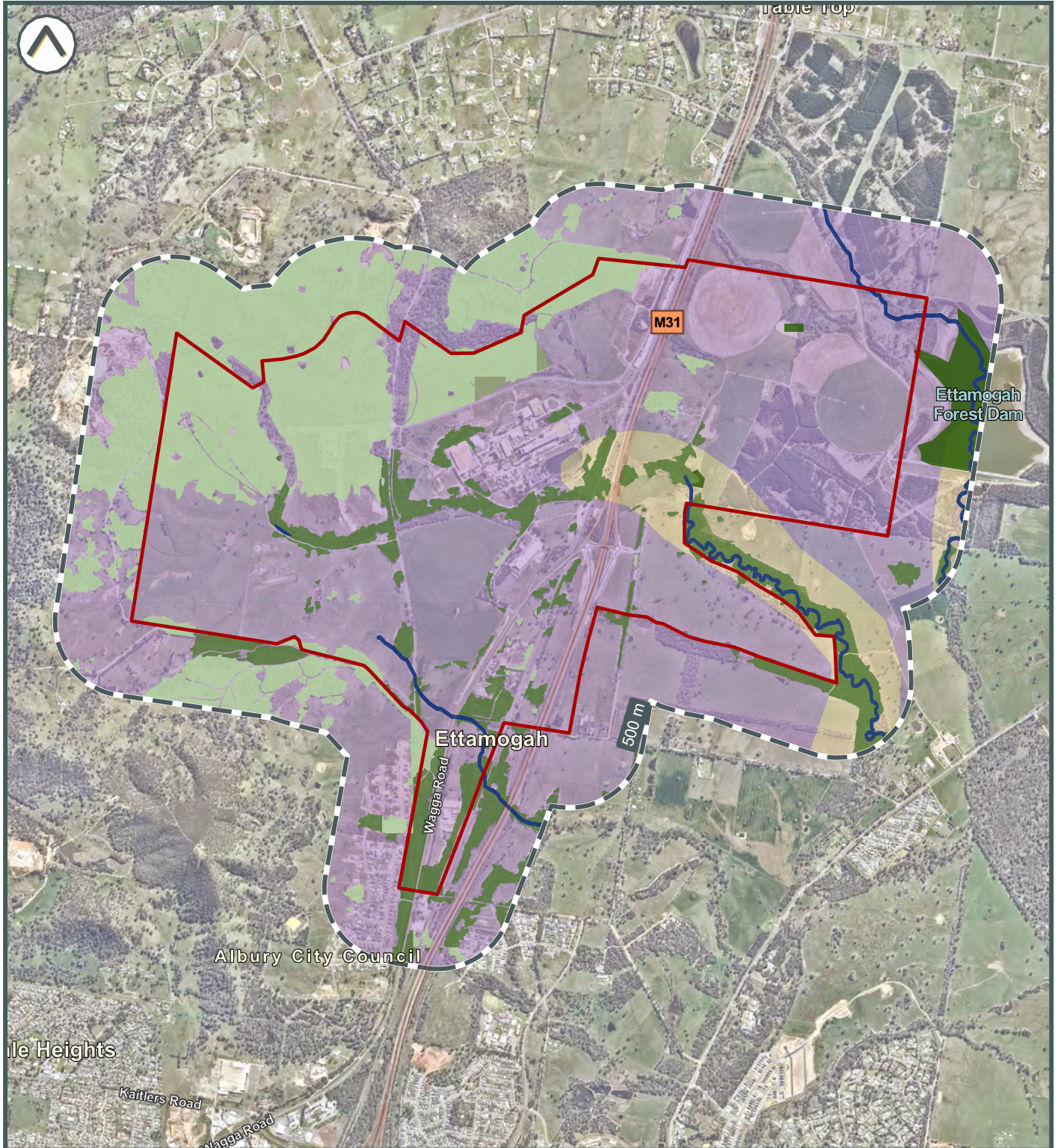


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Hydrogeology and Other Boreholes



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- Subject area
- Other borehole/monitoring well location
- Ecosystems that rely on the Surface expression of Groundwater
- High potential GDE – from national assessment
- Ecosystems that rely on Subsurface presence of Groundwater
- High potential GDE – from regional studies
- Moderate potential GDE – from regional studies
- Low potential GDE – from regional studies
- Hydrogeologic Unit**
- Upper Tertiary/Quaternary Aquifer (porous media – unconsolidated)
- Palaeozoic and Pre-Cambrian Fractured Rock Aquifers (low permeability)

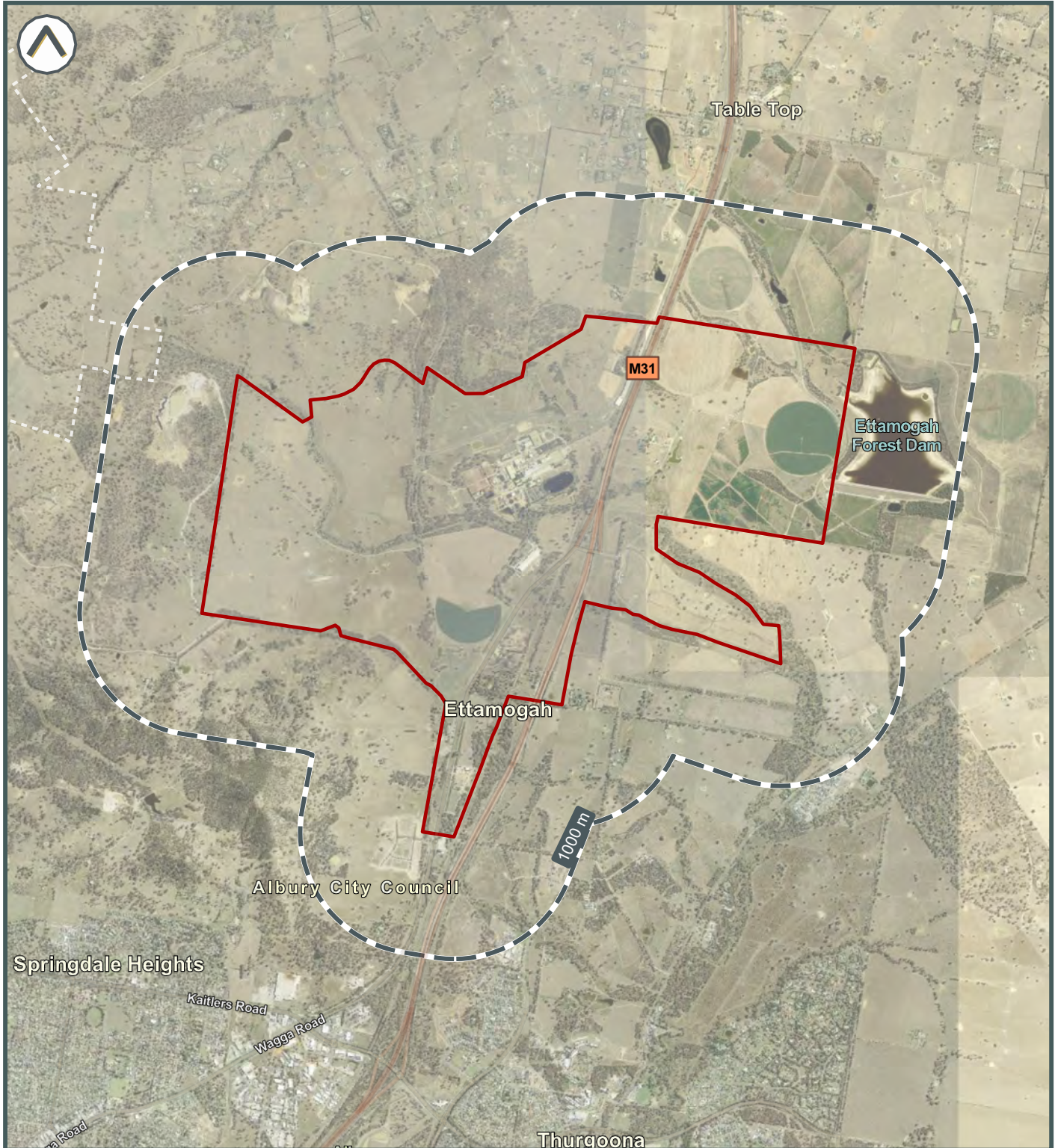


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Contaminated Land Public Register



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- Subject area
- Contaminated Land Register (EPA)
- Contaminated Land Register (EPA)
- Contaminated Land Record of Notices

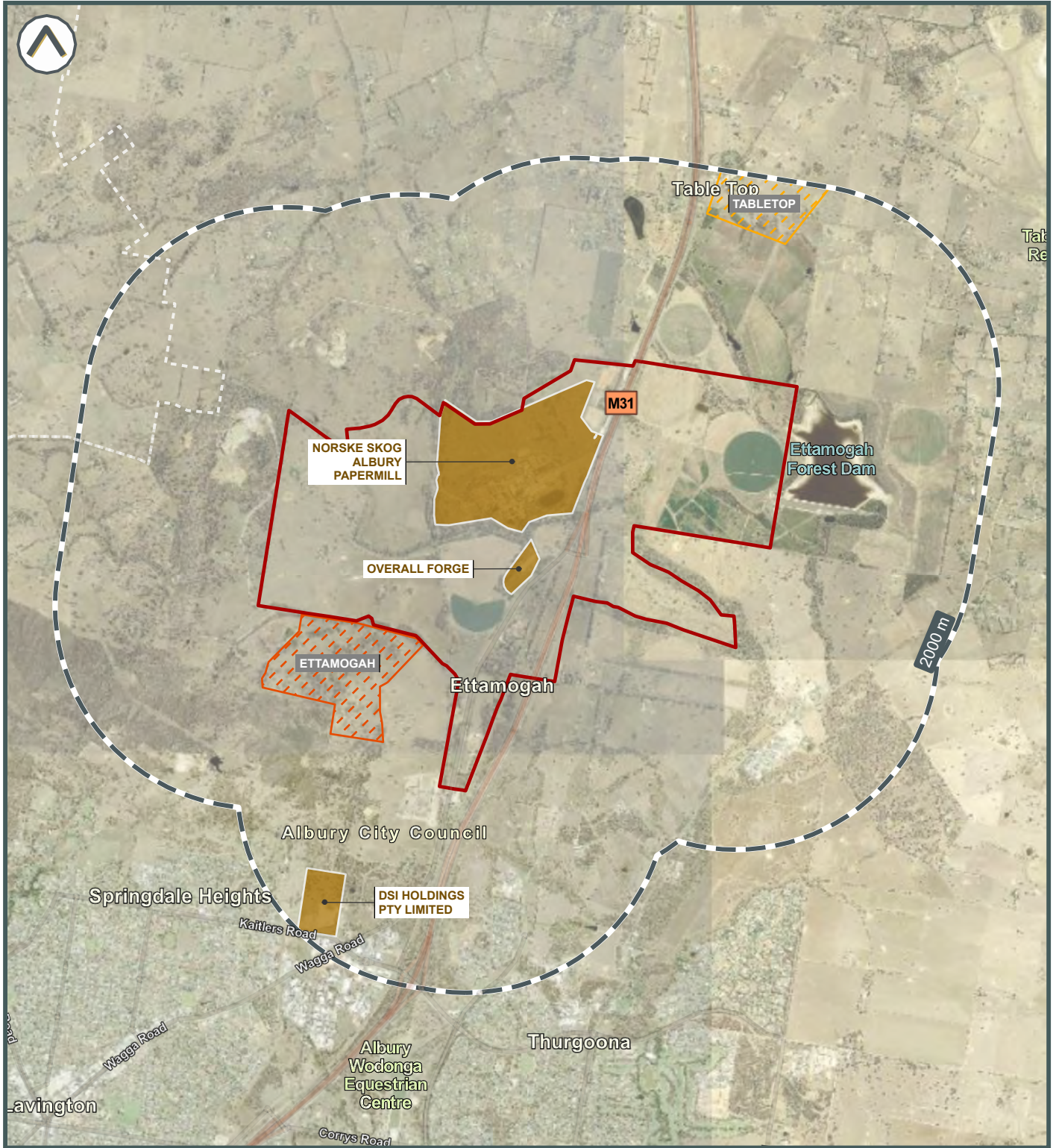


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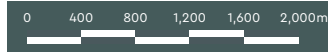


Sites Regulated by other Jurisdictional Body

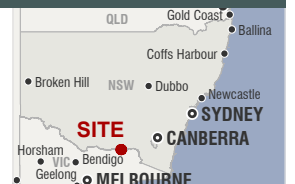


©2021 Land Insight (LI) www.landinsight.co | 18/11/2021 | Data source: Please refer to 'Digital Data Sources' in the Product Guide

- Subject area
- NPI Facilities
- Unexploded Ordnance (UXO) Areas
- Substantial Potential
- Slight potential

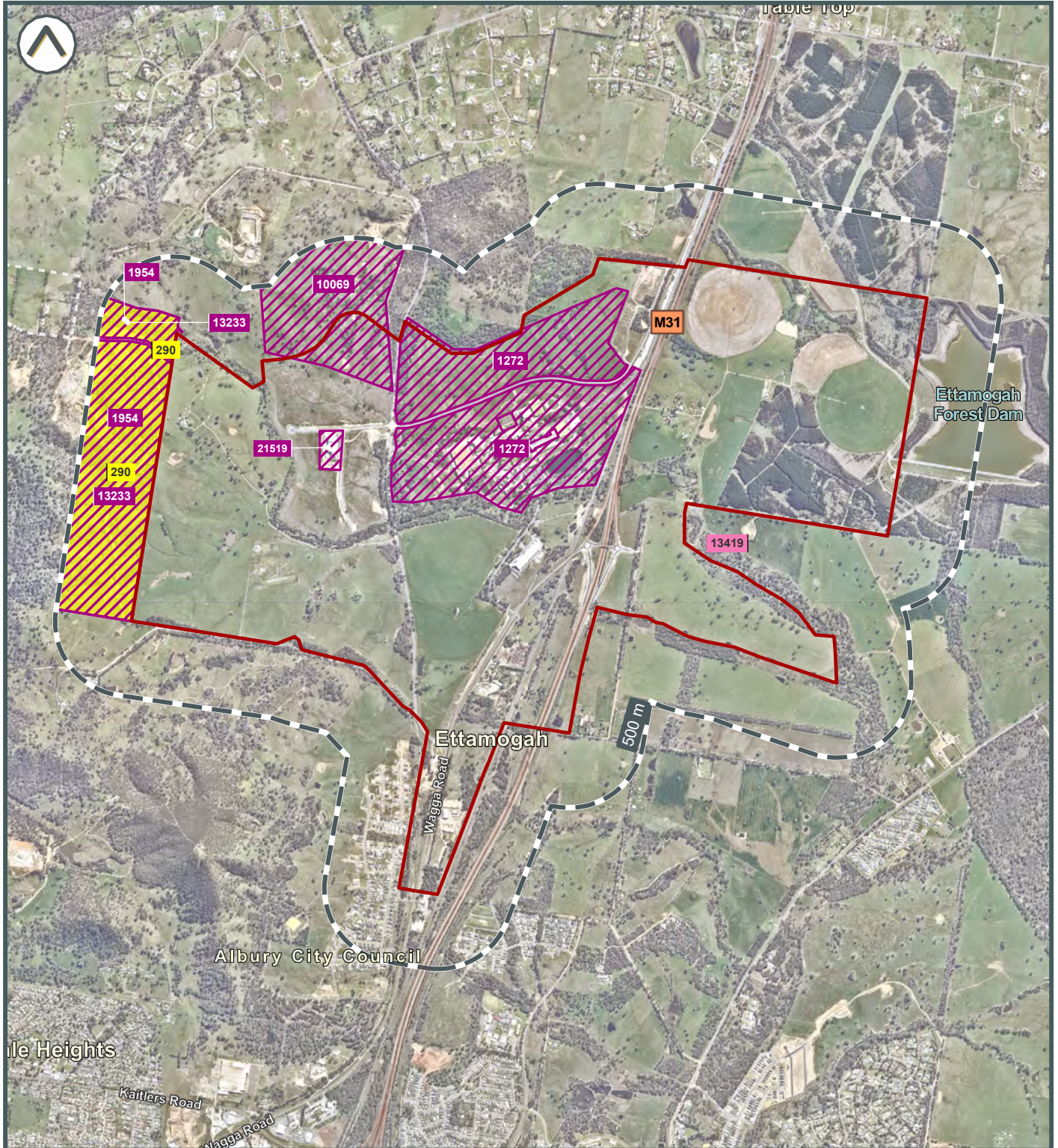


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Licensing Under the POEO Act



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- Subject area
- POEO Licences Issued
- Surrendered / Suspended / Revoked
- Delicensed / No longer in force
- Clean Up and Penalty Notices

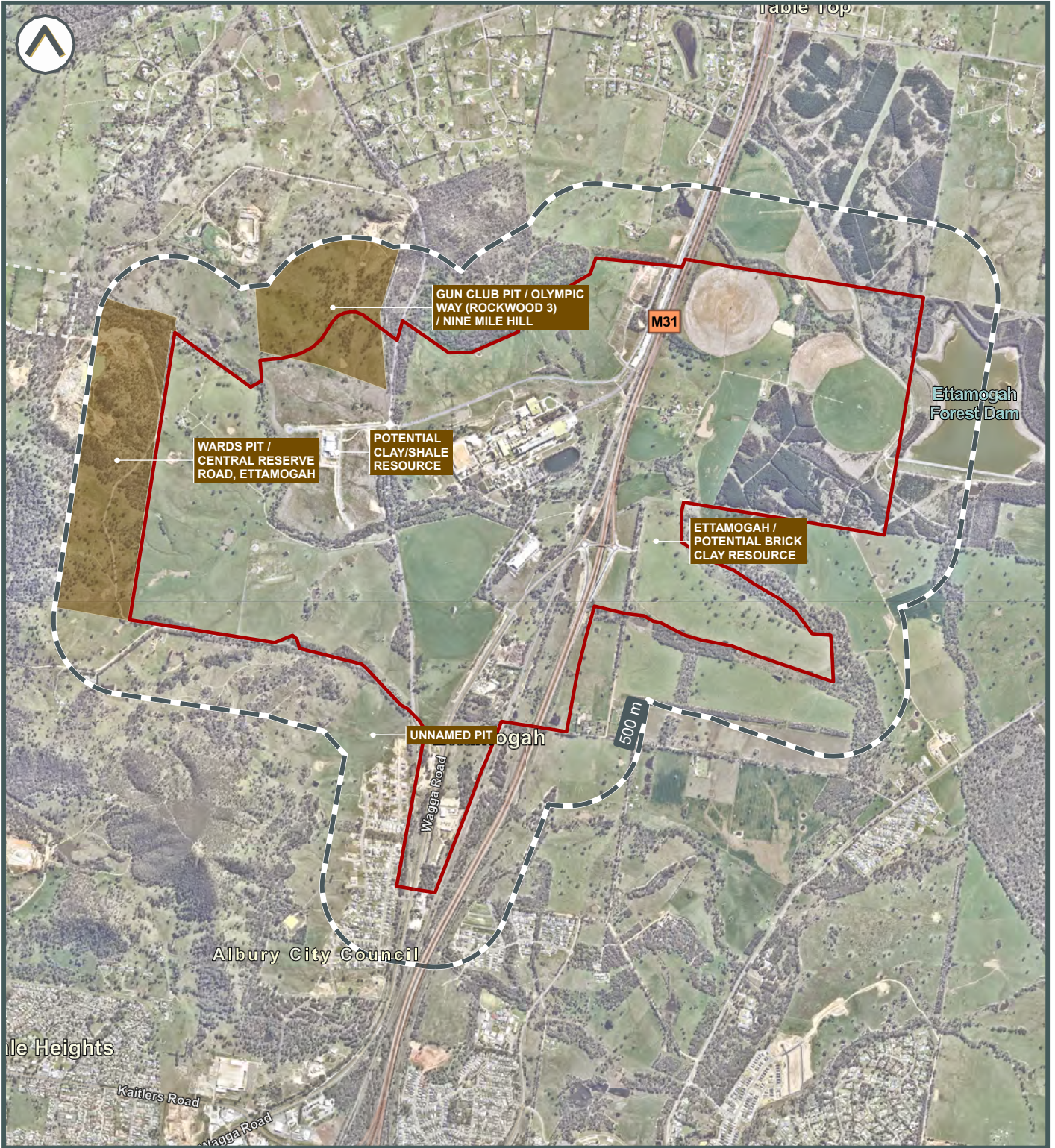


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Former Potentially Contaminated Land



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- Subject area
- Contaminated Legacy Areas
- Derelict Mines and Quarries
- James Hardie asbestos
- Historical (Legacy) Landfills

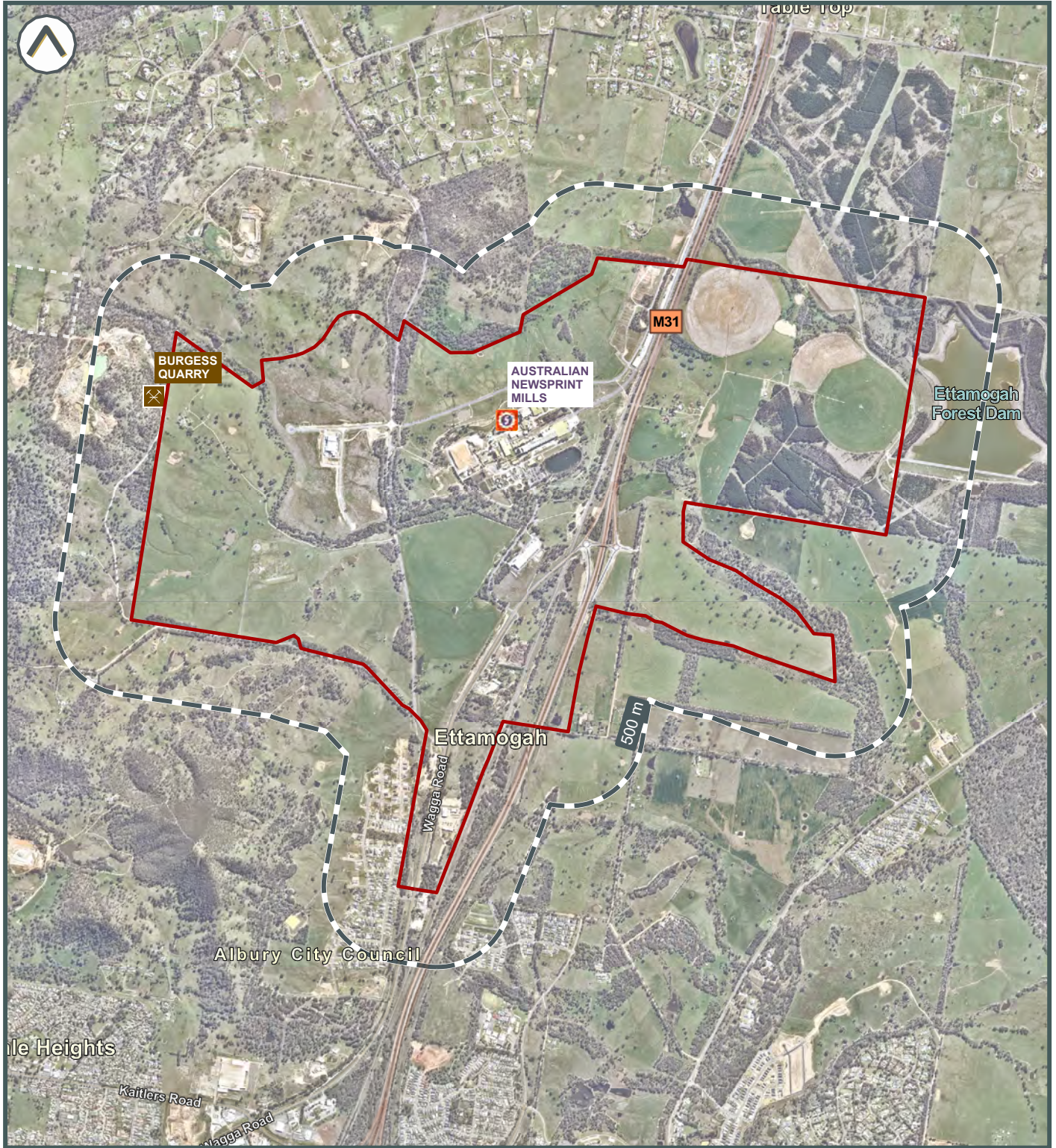


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Current Potentially Contaminating Activities (PCAs)



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- | | | | |
|--------------------------|--------------------|-----------------------------|------------------------------|
| Subject area | Fire Rescue | Operating Mines | Substation/switching station |
| Cattle Dip Sites | Gas Terminals | Power Stations | Telephone Exchanges |
| Operational Dry Cleaners | Liquid Fuel Depots | Operational Petrol Stations | Wastewater Treatment Plants |
| Former Dry Cleaners | | Former Petrol Stations | Waste Management Facilities |

Data is current as when this report was created. However due to the turnover of business locations, some addresses may be former.

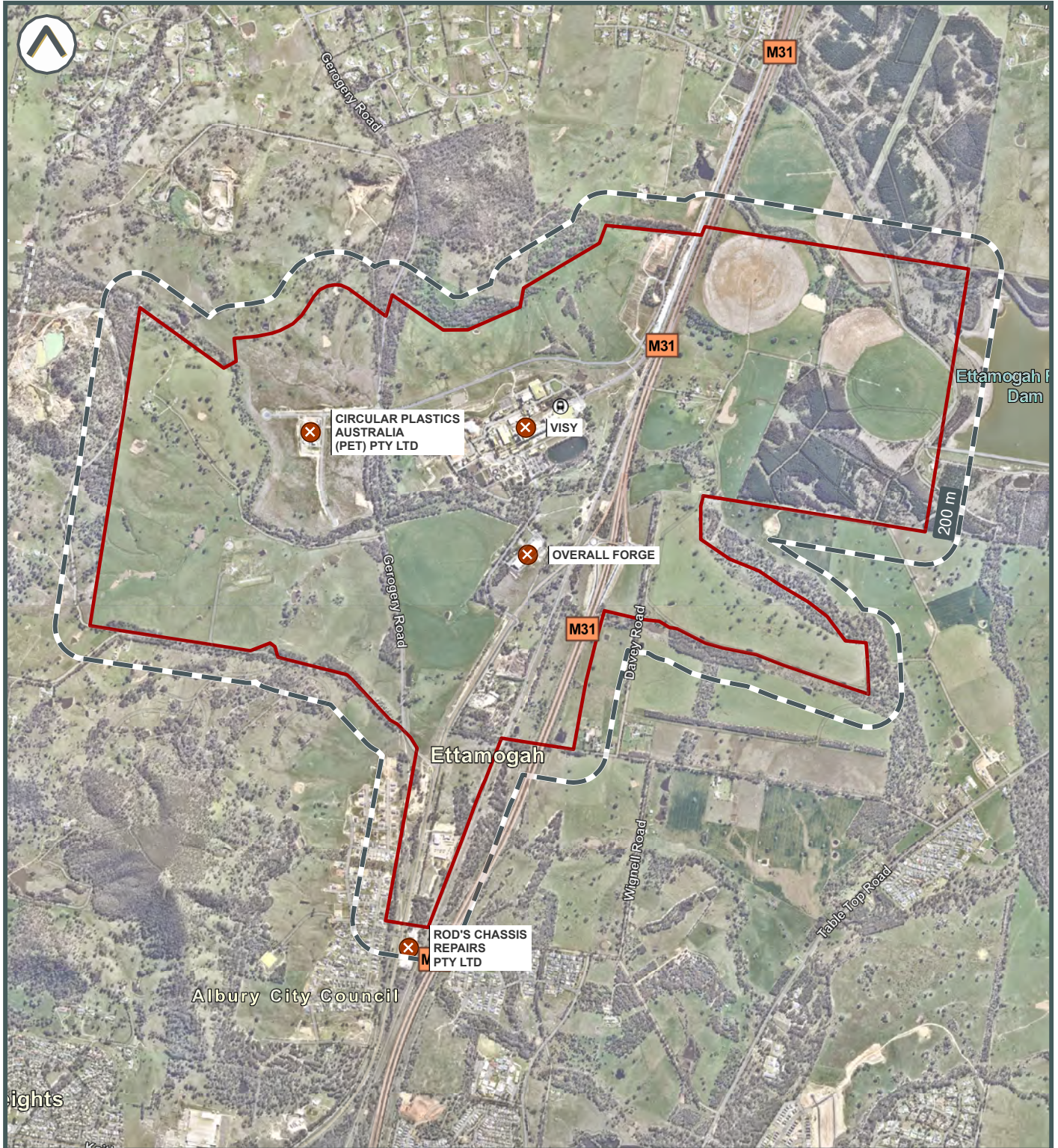


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Other Potentially Contaminating Activities



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- Subject area
- ⊗ Commercial & Trade Directory
- ⊗ Other potentially contaminating activities
- ⊗ Former potentially contaminating activities

*This is not an exhaustive list of all tanks

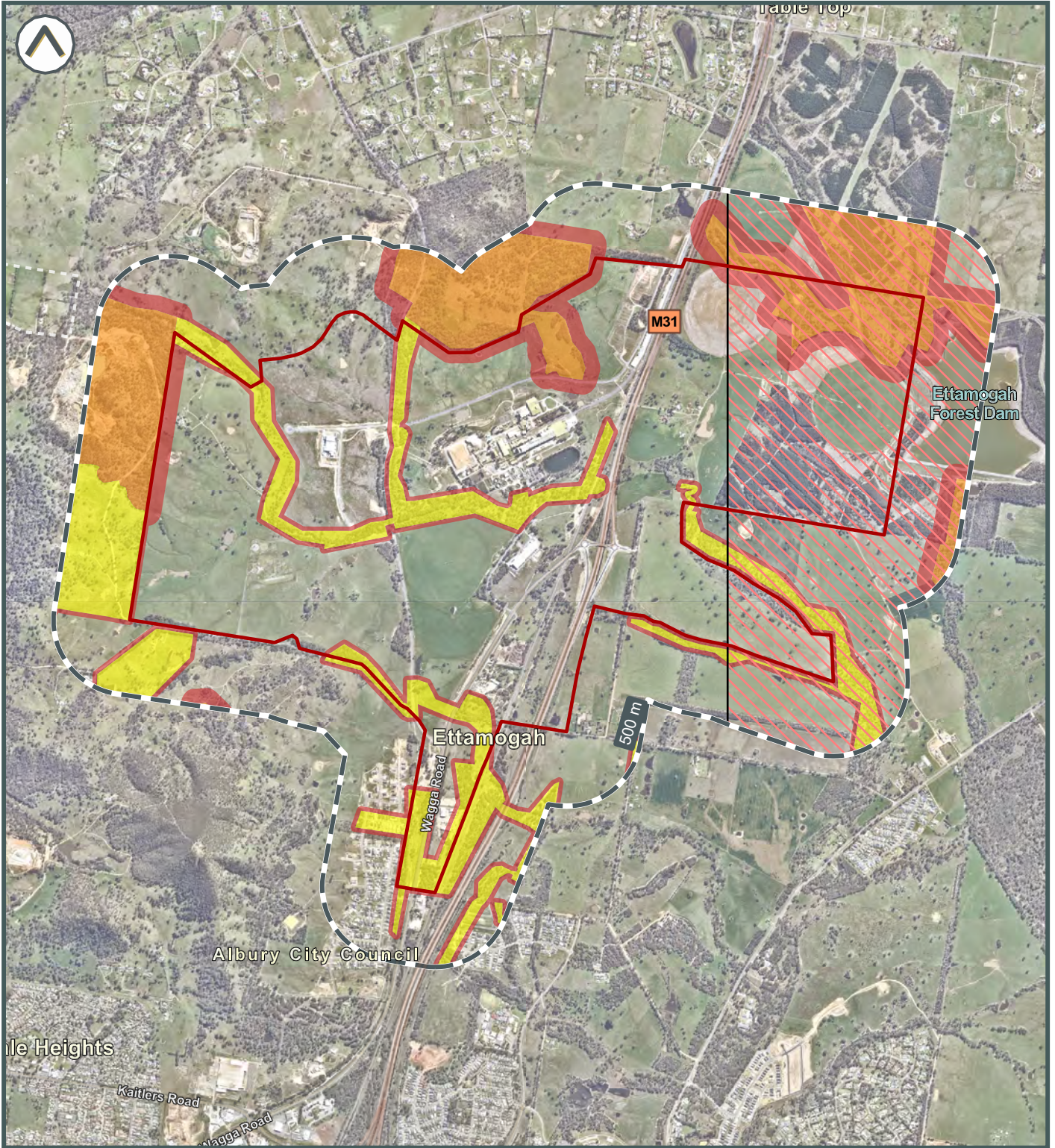


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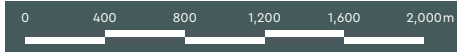


Fire and Flood Hazards



©2021 Land Insight (LI) www.landinsight.co | 18/11/2021 | Data source: Please refer to 'Digital Data Sources' in the Product Guide

- Subject area
- Bush Fire Prone Land
- Vegetation Buffer
- Vegetation Category 1
- Vegetation Category 2
- Erosion Hazard
- High



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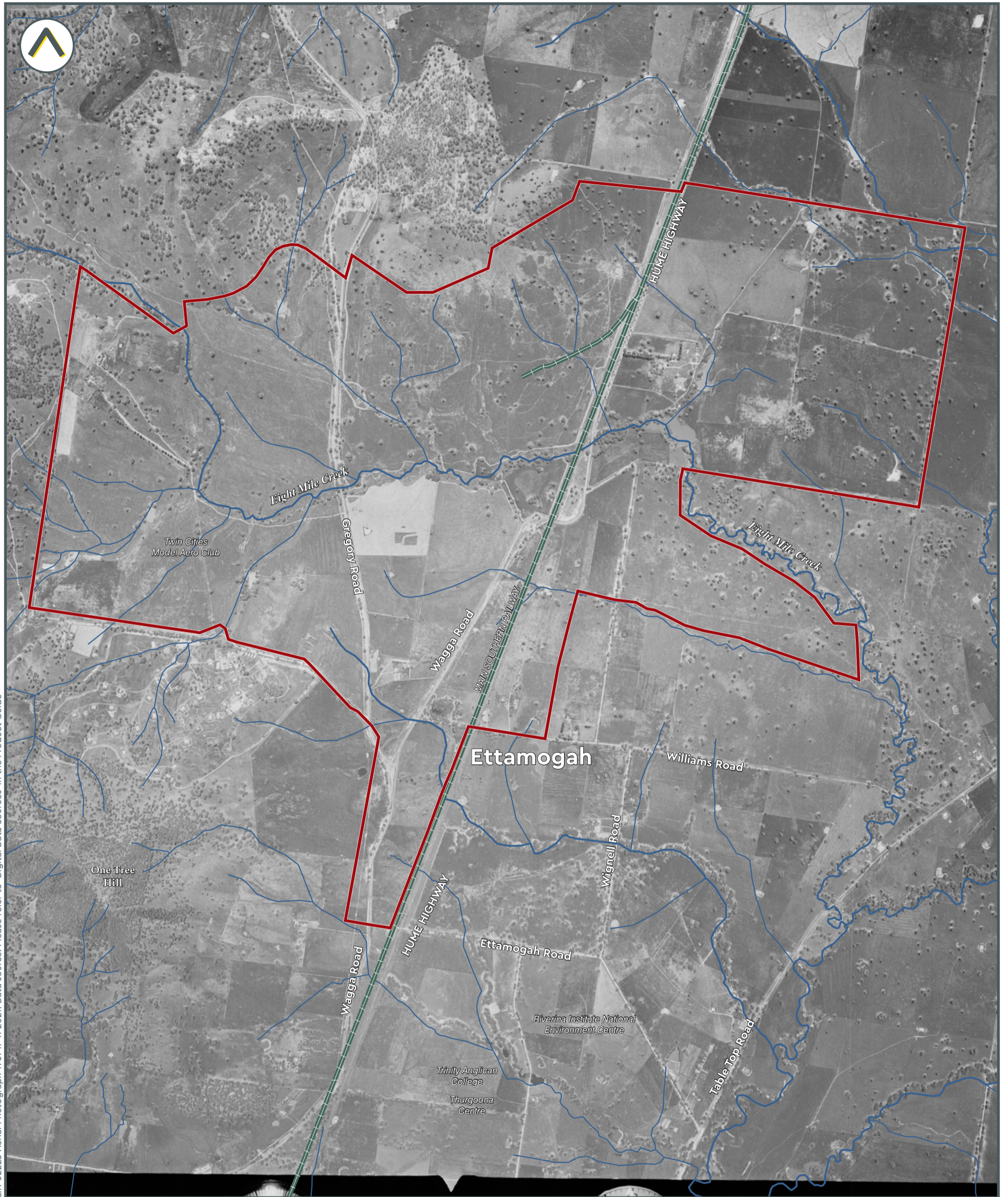




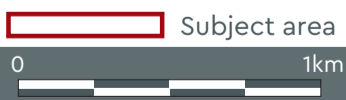
Appendix B

HISTORIC IMAGERY

Historic Aerial Photograph - 1961



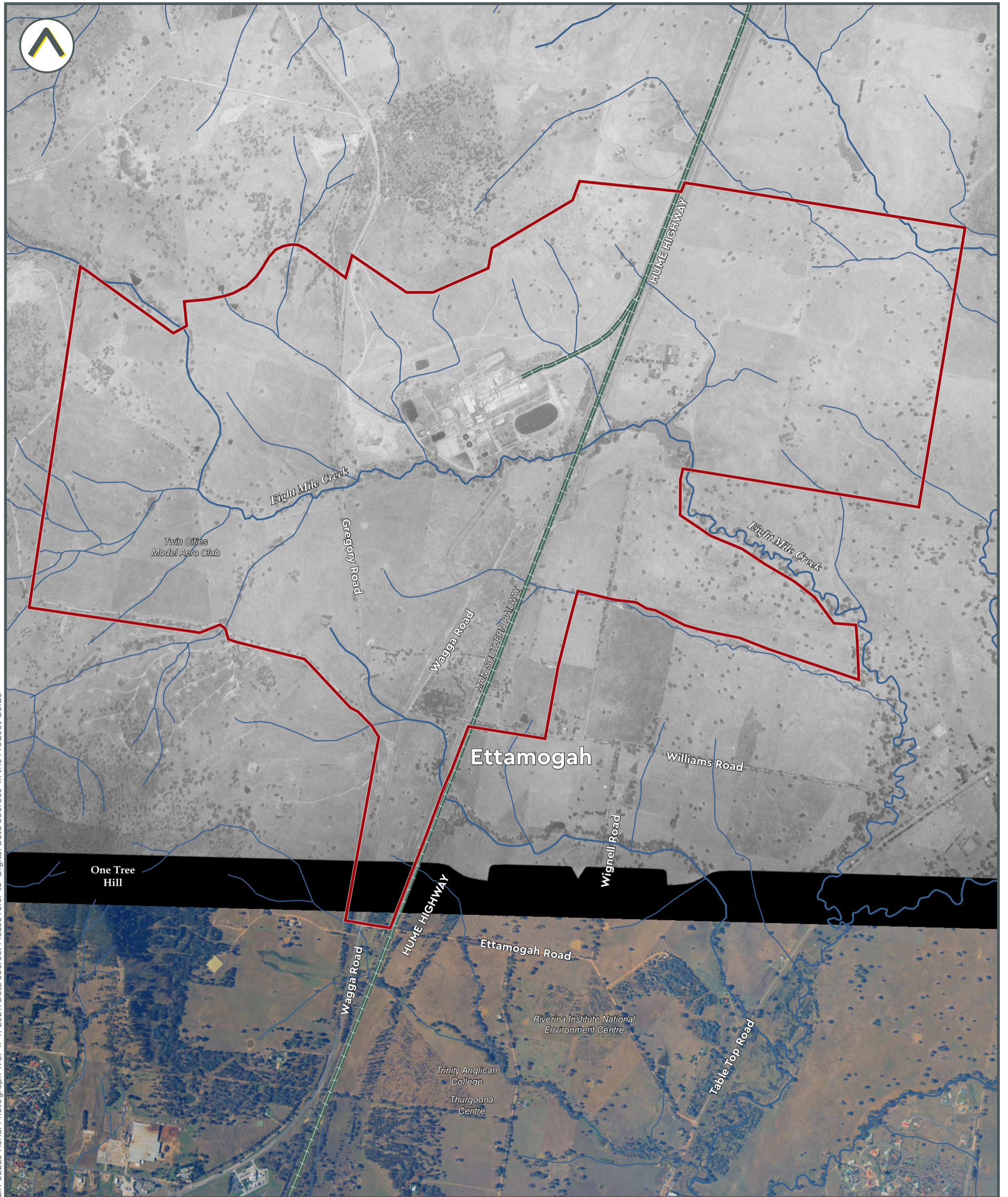
LIR-02225 Aerial Photograph 1961 17 11 2021. Data source: Please refer to 'Digital Data Sources' in the Product Guide



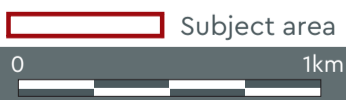
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Historic Aerial Photograph - 1987



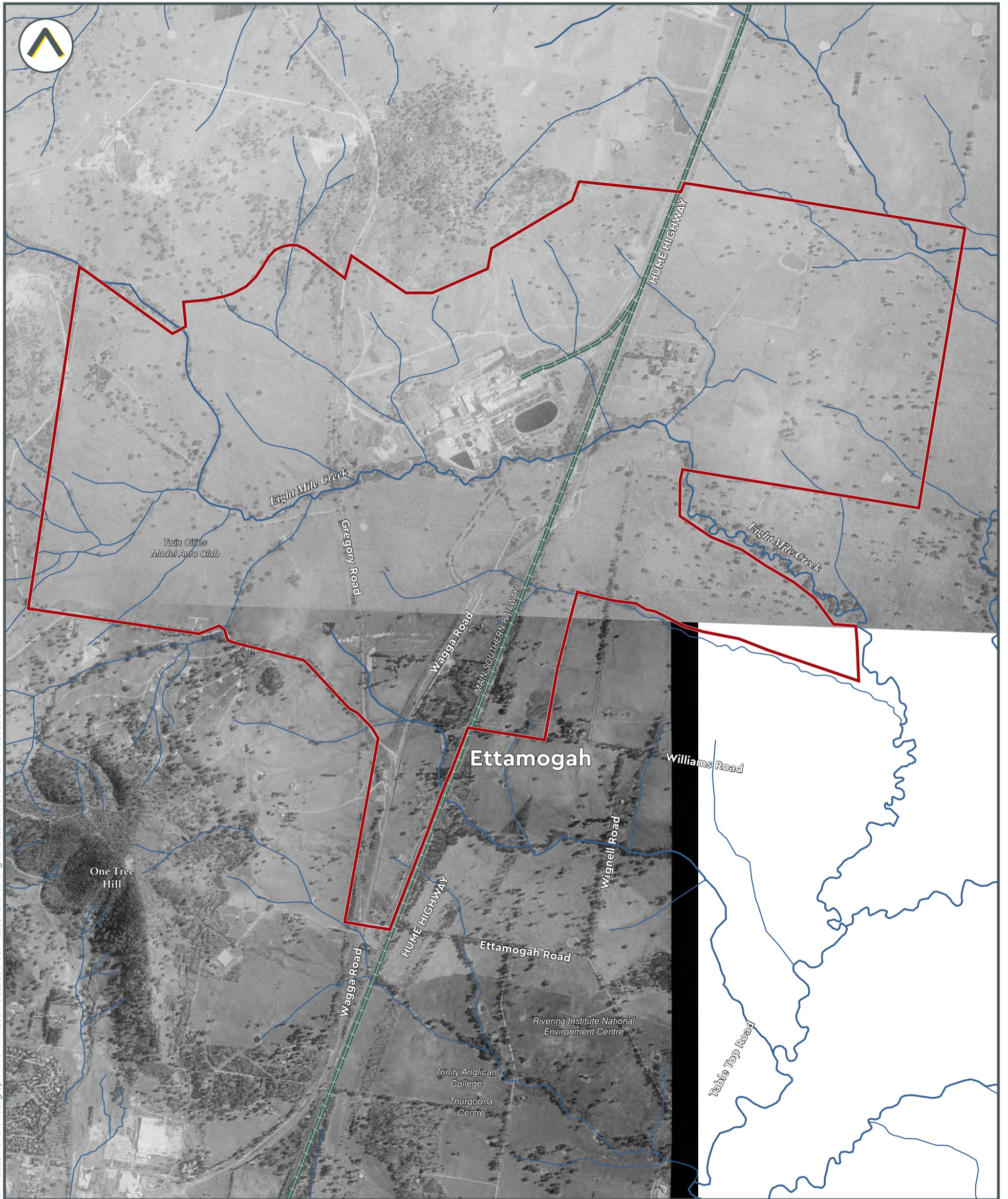
LIR-02225 Aerial Photograph 1987 17 11 2021. Data source: Please refer to 'Digital Data Sources' in the Product Guide



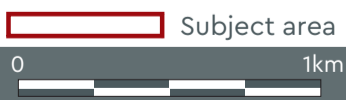
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Historic Aerial Photograph - 1987



LIR-02225 Aerial Photograph 1990 17 11 2021. Data source: Please refer to 'Digital Data Sources' in the Product Guide



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Historic Aerial Photograph - 1996



LIR-02225 Aerial Photograph 1996 17 11 2021. Data source: Please refer to 'Digital Data Sources' in the Product Guide

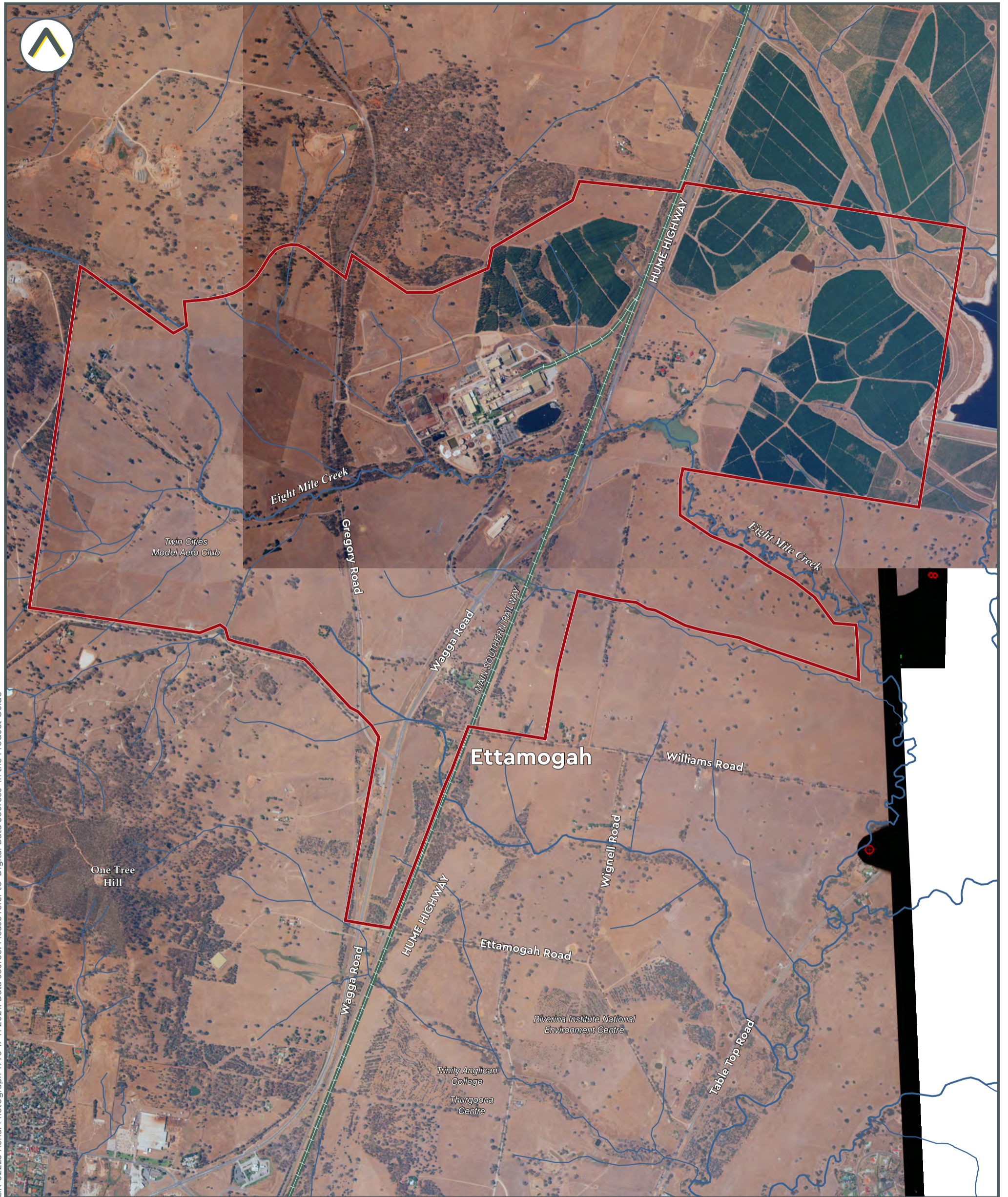
Subject area



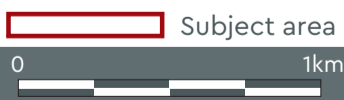
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Historic Aerial Photograph - 1998



LIR-02225 Aerial Photograph 1990 17 11 2021. Data source: Please refer to 'Digital Data Sources' in the Product Guide



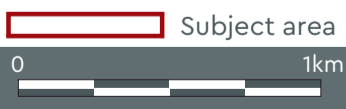
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Historic Aerial Photograph - 2003



LIR-02225 Aerial Photograph 2003 17 11 2021. Data source: Please refer to 'Digital Data Sources' in the Product Guide



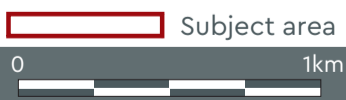
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Historic Aerial Photograph - 2010



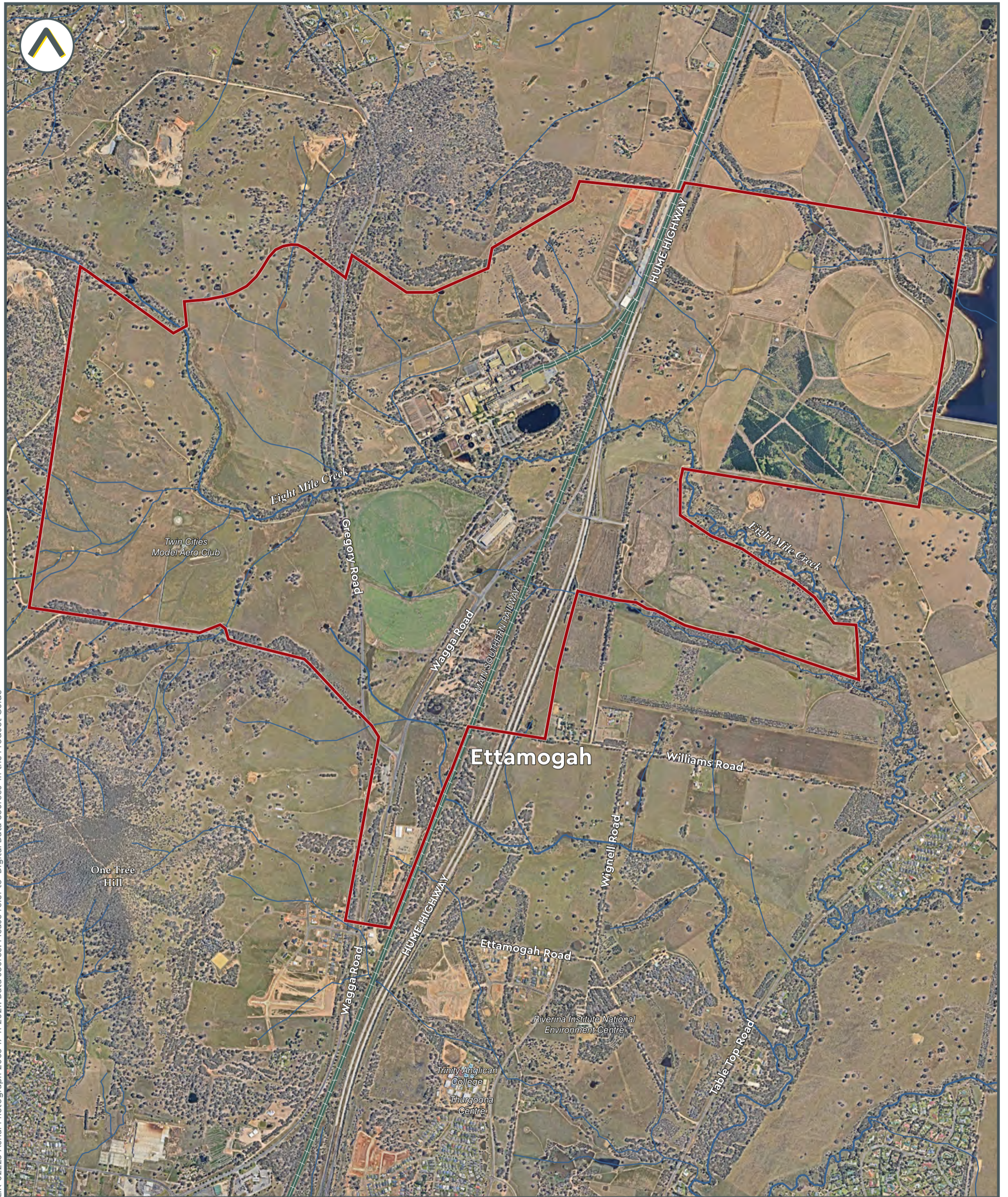
LIR-02225 Aerial Photograph 2003 17 11 2021. Data source: Please refer to 'Digital Data Sources' in the Product Guide



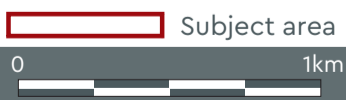
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Historic Aerial Photograph - 2015



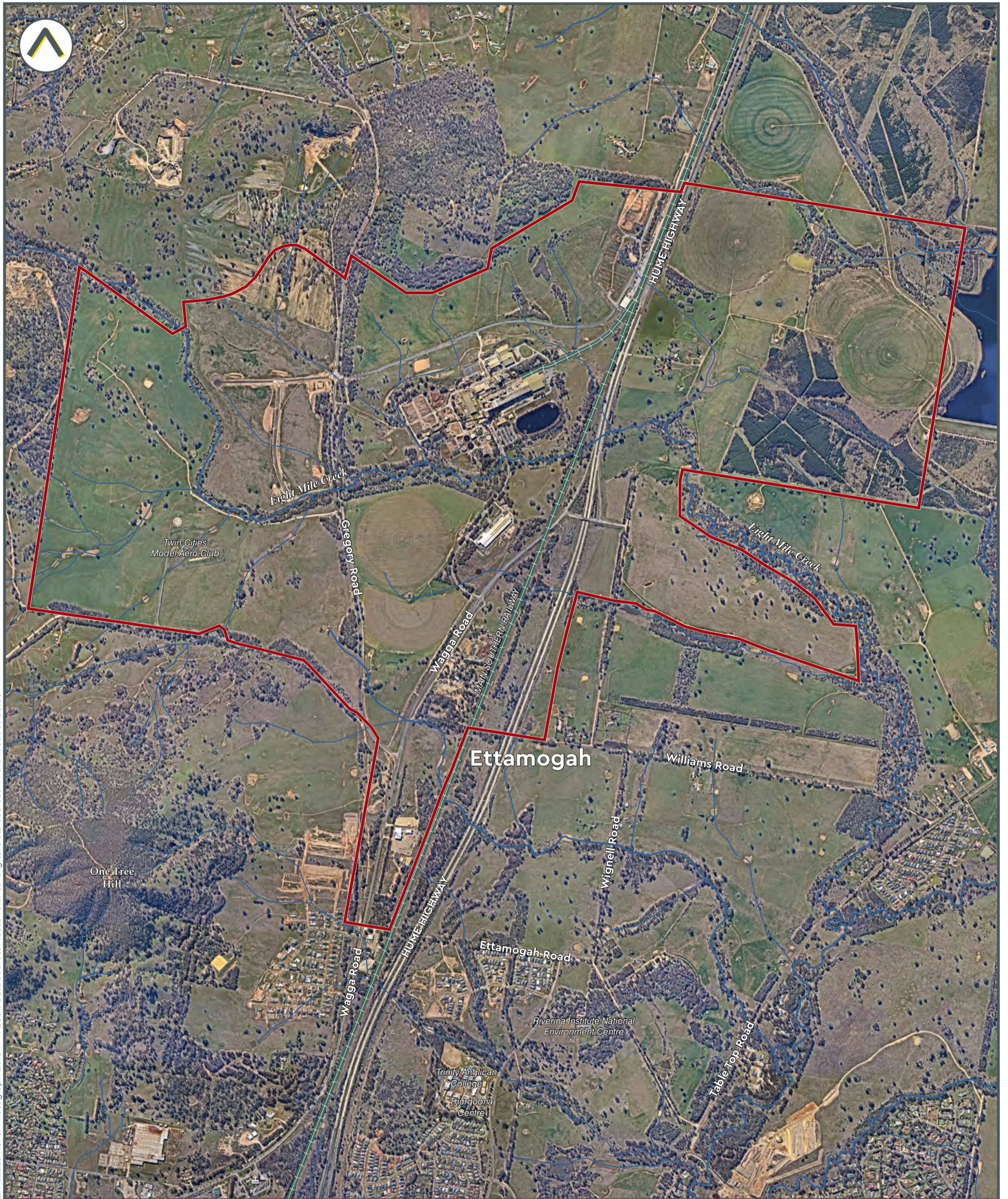
LIR-02225 Aerial Photograph 2003 17 11 2021. Data source: Please refer to 'Digital Data Sources' in the Product Guide



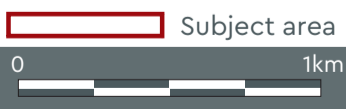
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Historic Aerial Photograph - 2018



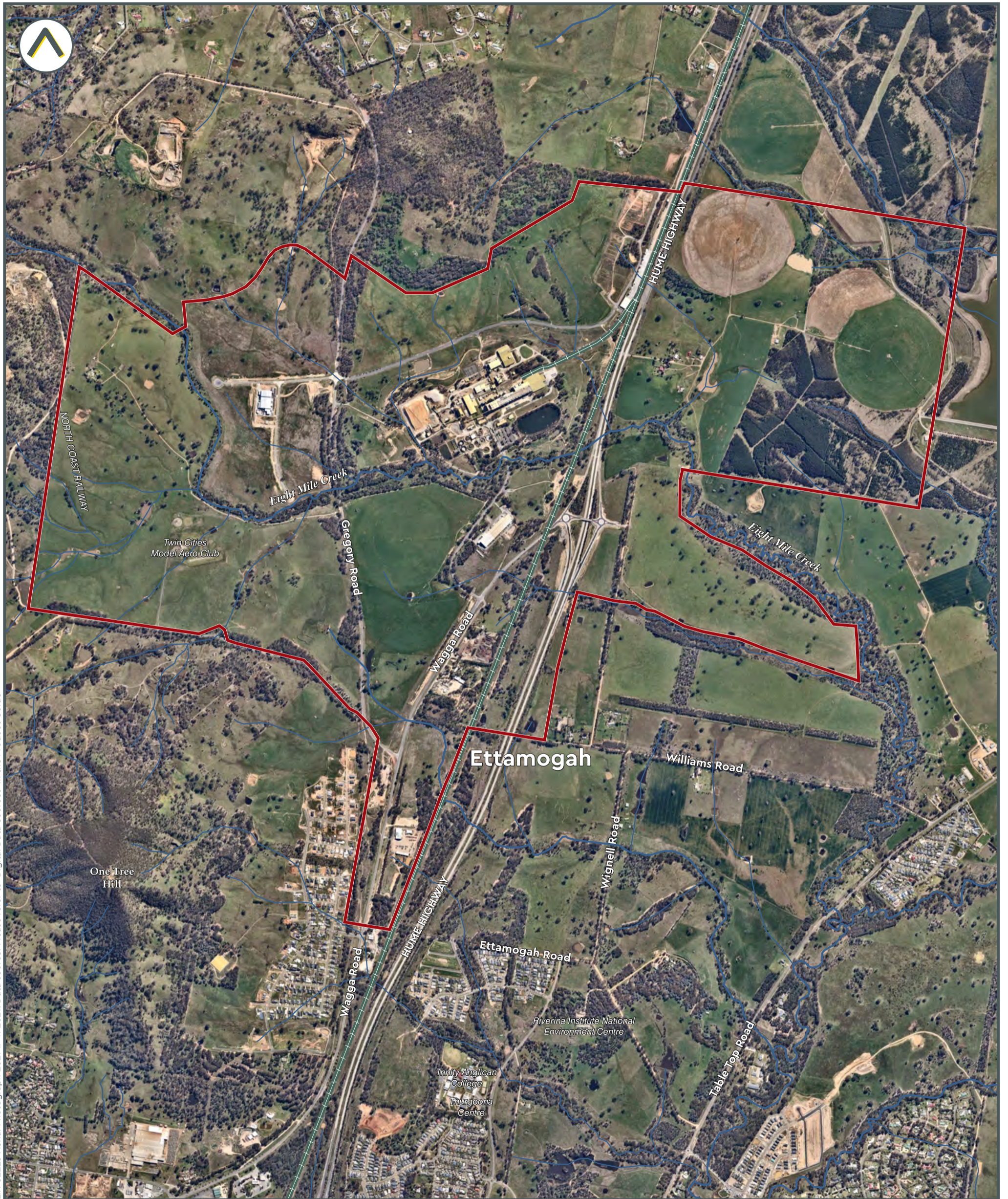
LIR-02225 Aerial Photograph 2018 17 11 2021. Data source: Please refer to 'Digital Data Sources' in the Product Guide




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Historic Aerial Photograph - 2021



LIR-02225 Aerial Photograph 2021 17 11 2021. Data source: Please refer to 'Digital Data Sources' in the Product Guide

 Subject area
0 1km



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APPENDIX B TABLES

	Salinity		
	Conductivity (1:5 aqueous extract at 25°C)	Electrical Conductivity as Ece (conversion)	Class Based on Ece Criteria
	US/CM	dS/m	
EQL	10	0.01	
DCLM 1992	2000	2	

Field_ID	LocCode	Sample_Depth_Range	Sampled_Date-Time	Monitoring_Round	Matrix_Description	Conductivity (US/CM)	Electrical Conductivity as Ece (dS/m)	Class
D01_220302	HA19	0.2-0.2	2/03/2022	Albury PASS	Clayey silt	180	1.62	Non-saline
D02_220302	HA20	0.2-0.2	2/03/2022	Albury PASS	Silt	18	0.162	Non-saline
HA01_0.2	HA01	0.2-0.2	2/03/2022	Albury PASS	Clayey silt	30	0.27	Non-saline
HA02_0.2	HA02	0.2-0.2	2/03/2022	Albury PASS	Silt	<10	0.09	Non-saline
HA03_0.2	HA03	0.2-0.2	2/03/2022	Albury PASS	Silt	49	0.441	Non-saline
HA04_0.2	HA04	0.2-0.2	2/03/2022	Albury PASS	Silty sand	12	0.108	Non-saline
HA05_0.2	HA05	0.2-0.2	2/03/2022	Albury PASS	Clayey silt	10	0.09	Non-saline
HA06_0.2	HA06	0.2-0.2	2/03/2022	Albury PASS	Clayey silt	13	0.117	Non-saline
HA07_0.5	HA07	0.5-0.5	2/03/2022	Albury PASS	Clayey silt	11	0.099	Non-saline
HA08_0.2	HA08	0.2-0.2	2/03/2022	Albury PASS	Silt	10	0.09	Non-saline
HA09_0.2	HA09	0.2-0.2	2/03/2022	Albury PASS	Silt	<10	0.09	Non-saline
HA10_0.2	HA10	0.2-0.2	2/03/2022	Albury PASS	Silt	12	0.108	Non-saline
HA11_0.2	HA11	0.2-0.2	2/03/2022	Albury PASS	Silt	12	0.108	Non-saline
HA12_0.2	HA12	0.2-0.2	2/03/2022	Albury PASS	Silt	-	-	-
HA12_0.5	HA12	0.5-0.5	2/03/2022	Albury PASS	Silt	99	0.891	Non-saline
HA13_0.1	HA13	0.1-0.1	2/03/2022	Albury PASS	Silt	38	0.342	Non-saline
HA14_0.2	HA14	0.2-0.2	2/03/2022	Albury PASS	Silt	41	0.369	Non-saline
HA15_0.5	HA15	0.5-0.5	2/03/2022	Albury PASS	Clay	56	0.504	Non-saline
HA16_0.2	HA16	0.2-0.2	2/03/2022	Albury PASS	Clayey silt	50	0.45	Non-saline
HA17_0.2	HA17	0.2-0.2	2/03/2022	Albury PASS	Silt	19	0.171	Non-saline
HA18_0.5	HA18	0.5-0.5	2/03/2022	Albury PASS	Silty clay	150	1.35	Non-saline
HA19_0.2	HA19	0.2-0.2	2/03/2022	Albury PASS	Clayey silt	210	1.89	Non-saline
HA20_0.2	HA20	0.2-0.2	2/03/2022	Albury PASS	Silt	11	0.099	Non-saline

Sodicty and CEC											
	Potassium (exchangeable)	Sodium (exchangeable)	Calcium (exchangeable)	Magnesium (exchangeable)	Cation Exchange Capacity (Sum)	ESP	Soil Sodicty				
								MEQ/100G	MEQ/100G	MEQ/100G	MEQ/100G
EQL	0.1	0.1	0.1	0.1	0.4	-					
Non-Sodic						<5					
Sodic						5-15					
Highly Sodic						>15					
Very Low CEC					<6						
Low CEC					6-12						
Moderate CEC					13-25						
High CEC					26-40						

Field_ID	LocCode	Sample_Depth_Range	Sampled_Date-Time	Matrix_Description	Potassium (exchangeable)	Sodium (exchangeable)	Calcium (exchangeable)	Magnesium (exchangeable)	Cation Exchange Capacity (Sum)	ESP	Soil Sodicty
D01_220302	HA19	0.2-0.2	2/03/2022	Clayey silt	0.9	3.6	7.6	2.6	14.70	24.5	Highly Sodic
D02_220302	HA20	0.2-0.2	2/03/2022	Silt	0.2	<0.1	0.1	0.1	0.40	<1	Non-Sodic
HA01_0.2	HA01	0.2-0.2	2/03/2022	Clayey silt	0.8	1	4.6	9.9	16.30	6.13	Sodic
HA02_0.2	HA02	0.2-0.2	2/03/2022	Silt	0.3	<0.1	1.2	0.2	1.70	<1	Non-Sodic
HA03_0.2	HA03	0.2-0.2	2/03/2022	Silt	0.2	1.3	7.1	2.6	11.20	11.61	Sodic
HA04_0.2	HA04	0.2-0.2	2/03/2022	Silty sand	0.4	<0.1	4.4	4.1	8.90	<1	Non-Sodic
HA05_0.2	HA05	0.2-0.2	2/03/2022	Clayey silt	0.6	<0.1	1.2	1.1	2.90	<1	Non-Sodic
HA06_0.2	HA06	0.2-0.2	2/03/2022	Clayey silt	0.3	<0.1	4	0.6	4.90	<1	Non-Sodic
HA07_0.5	HA07	0.5-0.5	2/03/2022	Clayey silt	0.3	<0.1	2.7	4.2	7.20	<1	Non-Sodic
HA08_0.2	HA08	0.2-0.2	2/03/2022	Silt	<0.1	<0.1	1.9	0.3	2.20	<1	Non-Sodic
HA09_0.2	HA09	0.2-0.2	2/03/2022	Silt	0.5	5.4	3.8	5.5	15.20	35.53	Highly Sodic
HA10_0.2	HA10	0.2-0.2	2/03/2022	Silt	0.2	0.1	0.9	0.7	1.90	5.26	Sodic
HA11_0.2	HA11	0.2-0.2	2/03/2022	Silt	0.5	<0.1	4.9	0.9	6.30	<1	Non-Sodic
HA12_0.2	HA12	0.2-0.2	2/03/2022	Silt	-	-	-	-	-	-	-
HA12_0.5	HA12	0.5-0.5	2/03/2022	Silt	0.1	<0.1	1.3	<0.1	1.40	<1	Non-Sodic
HA13_0.1	HA13	0.1-0.1	2/03/2022	Silt	0.8	<0.1	6.8	1	8.60	<1	Non-Sodic
HA14_0.2	HA14	0.2-0.2	2/03/2022	Silt	1.2	<0.1	3.6	2.1	6.90	<1	Non-Sodic
HA15_0.5	HA15	0.5-0.5	2/03/2022	Clay	1.6	1.1	6.7	12	21.40	5.14	Sodic
HA16_0.2	HA16	0.2-0.2	2/03/2022	Clayey silt	0.5	1.4	5.2	1.6	8.70	16.09	Highly Sodic
HA17_0.2	HA17	0.2-0.2	2/03/2022	Silt	0.2	0.3	2.4	1.6	4.50	6.67	Sodic
HA18_0.5	HA18	0.5-0.5	2/03/2022	Silty clay	0.8	2.4	8.7	10	21.90	10.96	Sodic
HA19_0.2	HA19	0.2-0.2	2/03/2022	Clayey silt	1	3.9	8.2	2.8	15.90	24.53	Highly Sodic
HA20_0.2	HA20	0.2-0.2	2/03/2022	Silt	0.2	<0.1	<0.1	<0.1	0.20	<1	Non-Sodic

	Sulphate (as SO4) mg/kg	Sulphate (as SO3)^ mg/kg	pH (aqueous extract) pH Units	Aggressivity to Concrete	Chloride mg/kg	pH (aqueous extract) pH Units	Aggressivity to Steel
EQL	10	8	0.1		10	0.1	
Aggressivity to Concrete - Non-aggressive		<5000	>5.5				
Aggressivity to Concrete - Mild		5000-10000	4.5-5.5				
Aggressivity to Concrete - Moderate		10000-20000	4-4.5				
Aggressivity to Concrete - Severe		>20000	<4				
Aggressivity to Steel - Non-aggressive					<5000	>5	
Aggressivity to Steel - Mild					5000-20000	4-5	
Aggressivity to Steel - Moderate					20000-50000	3-4	
Aggressivity to Steel - Severe					>50000	<3	

Field_ID	LocCode	Sample_Depth_Range	Sampled_Date-Time	Matrix_Description	Sulphate (as SO4) mg/kg	Sulphate (as SO3)^ mg/kg	pH (aqueous extract) pH Units	Aggressivity to Concrete	Chloride mg/kg	pH (aqueous extract) pH Units	Aggressivity to Steel
D01_220302	HA19	0.2-0.2	2/03/2022	Clayey silt	160	128	8.5	Non-aggressive	24	8.5	Non-aggressive
D02_220302	HA20	0.2-0.2	2/03/2022	Silt	10	8	5	Mild	<10	5	Non-aggressive
HA01_0.2	HA01	0.2-0.2	2/03/2022	Clayey silt	37	29.6	5.9	Non-aggressive	<10	5.9	Non-aggressive
HA02_0.2	HA02	0.2-0.2	2/03/2022	Silt	<10	<10	5.7	Non-aggressive	<10	5.7	Non-aggressive
HA03_0.2	HA03	0.2-0.2	2/03/2022	Silt	11	8.8	8.7	Non-aggressive	<10	8.7	Non-aggressive
HA04_0.2	HA04	0.2-0.2	2/03/2022	Silty sand	<10	<10	6.3	Non-aggressive	<10	6.3	Non-aggressive
HA05_0.2	HA05	0.2-0.2	2/03/2022	Clayey silt	<10	<10	5.8	Non-aggressive	<10	5.8	Non-aggressive
HA06_0.2	HA06	0.2-0.2	2/03/2022	Clayey silt	11	8.8	7.1	Non-aggressive	<10	7.1	Non-aggressive
HA07_0.5	HA07	0.5-0.5	2/03/2022	Clayey silt	16	12.8	5.3	Mild	<10	5.3	Non-aggressive
HA08_0.2	HA08	0.2-0.2	2/03/2022	Silt	11	8.8	5.6	Non-aggressive	<10	5.6	Non-aggressive
HA09_0.2	HA09	0.2-0.2	2/03/2022	Silt	<10	<10	5.6	Non-aggressive	<10	5.6	Non-aggressive
HA10_0.2	HA10	0.2-0.2	2/03/2022	Silt	<10	<10	6.5	Non-aggressive	<10	6.5	Non-aggressive
HA11_0.2	HA11	0.2-0.2	2/03/2022	Silt	<10	<10	7	Non-aggressive	<10	7	Non-aggressive
HA12_0.2	HA12	0.2-0.2	2/03/2022	Silt	-	-	-	-	-	-	-
HA12_0.5	HA12	0.5-0.5	2/03/2022	Silt	110	88	8.3	Non-aggressive	14	8.3	Non-aggressive
HA13_0.1	HA13	0.1-0.1	2/03/2022	Silt	12	9.6	7.3	Non-aggressive	<10	7.3	Non-aggressive
HA14_0.2	HA14	0.2-0.2	2/03/2022	Silt	16	12.8	5.9	Non-aggressive	<10	5.9	Non-aggressive
HA15_0.5	HA15	0.5-0.5	2/03/2022	Clay	32	25.6	6.5	Non-aggressive	<10	6.5	Non-aggressive
HA16_0.2	HA16	0.2-0.2	2/03/2022	Clayey silt	11	8.8	8.7	Non-aggressive	11	8.7	Non-aggressive
HA17_0.2	HA17	0.2-0.2	2/03/2022	Silt	13	10.4	7.5	Non-aggressive	<10	7.5	Non-aggressive
HA18_0.5	HA18	0.5-0.5	2/03/2022	Silty clay	250	200	7.2	Non-aggressive	21	7.2	Non-aggressive
HA19_0.2	HA19	0.2-0.2	2/03/2022	Clayey silt	270	216	8.3	Non-aggressive	29	8.3	Non-aggressive
HA20_0.2	HA20	0.2-0.2	2/03/2022	Silt	<10	<10	5.1	Mild	<10	5.1	Non-aggressive

APPENDIX C PHOTOLOG



PHOTOGRAPHIC LOG

Client Name: Department of Regional NSW	Site Location: Albury RJP	Project No.: 0621304
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Photo No. 1	Date: 2/3/2022
Description: Building rubble indicating former footprint of demolished structure (off Gregory Road near Eight Mile Creek)	



Photo No. 2	Date: 2/3/2022
Description: Building rubble indicating former footprint of demolished structure (near Wagga Road and Seven Mile Creek)	





PHOTOGRAPHIC LOG

Client Name: Department of Regional NSW	Site Location: Albury RJP	Project No.: 0621304
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Photo No. 3	Date: 2/3/2022
Description: Building rubble indicating former footprint of demolished structure (near Wagga Road and Seven Mile Creek)	



Photo No. 4	Date: 2/3/2022
Description: Raised mound with building rubble, likely associated with former demolished structures (near Wagga Road and Seven Mile Creek)	





PHOTOGRAPHIC LOG

Client Name: Department of Regional NSW	Site Location: Albury RJP	Project No.: 0621304
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Photo No. 5	Date: 2/3/2022
Description: Raised mound with building rubble, likely associated with former demolished structures (near Wagga Road and Seven Mile Creek)	



Photo No. 6	Date: 2/3/2022
Description: Uncontrolled waste dumping near surface water dam near Model Aeroclub	





PHOTOGRAPHIC LOG

Client Name: Department of Regional NSW	Site Location: Albury RJP	Project No.: 0621304
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Photo No. 7	Date: 2/3/2022
Description: Uncontrolled waste dumping near surface water dam near Model Aeroclub	



Photo No. 8	Date: 2/3/2022
Description:	





PHOTOGRAPHIC LOG

Client Name: Department of Regional NSW	Site Location: Albury RJP	Project No.: 0621304
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Photo No. 9	Date: 2/3/2022	
Description: Grassed agricultural areas		

Photo No. 10	Date: 2/3/2022	
Description: Soil sample location HA04		



PHOTOGRAPHIC LOG

Client Name: Department of Regional NSW	Site Location: Albury RJP	Project No.: 0621304
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Photo No. 11	Date: 2/3/2022	
Description: Grassed agricultural areas		

Photo No. 12	Date: 2/3/2022	
Description: Soil sample location HA05		



PHOTOGRAPHIC LOG

Client Name: Department of Regional NSW	Site Location: Albury RJP	Project No.: 0621304
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Photo No. 13	Date: 2/3/2022
Description: Soil sample location HA07	



Photo No. 14	Date: 2/3/2022
Description: Soil sample location HA08	





PHOTOGRAPHIC LOG

Client Name: Department of Regional NSW	Site Location: Albury RJP	Project No.: 0621304
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Photo No. 15	Date: 2/3/2022
Description: Soil sample location HA12	



Photo No. 16	Date: 2/3/2022
Description: Soil sample location HA15	





PHOTOGRAPHIC LOG

Client Name: Department of Regional NSW	Site Location: Albury RJP	Project No.: 0621304
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Photo No. 17	Date: 2/3/2022	
Description: Irrigated pasture		

Photo No. 18	Date: 2/3/2022	
Description: Pine plantation		



PHOTOGRAPHIC LOG

Client Name: Department of Regional NSW	Site Location: Albury RJP	Project No.: 0621304
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Photo No. 19	Date: 2/3/2022
Description: Soil sample location HA19	



Photo No. 20	Date: 2/3/2022
Description: Soil sample location HA20	





PHOTOGRAPHIC LOG

Client Name: Department of Regional NSW	Site Location: Albury RJP	Project No.: 0621304
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Photo No. 21	Date: 2/3/2022	
Description: Soil sampling location HA20		

Photo No. 22	Date: 2/3/2022	
Description: Soil cutting at 35°59'33.08"S, 147°0'1.07"E between HA13, HA14, and HA15		



PHOTOGRAPHIC LOG

Client Name: Department of Regional NSW	Site Location: Albury RJP	Project No.: 0621304
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Photo No. 23	Date: 2/3/2022	
Description: Soil cutting at 36°0'29.49"S 146°59'1.65"E between Wagga rd. and a Visy pasture.		

Photo No. 24	Date: 2/3/2022	
Description: Soil sample location HA07; example of red- brown clayey silt		



PHOTOGRAPHIC LOG

Client Name: Department of Regional NSW	Site Location: Albury RJP	Project No.: 0621304
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Photo No. 25	Date: 2/3/2022
Description: Soil sample location HA12	



APPENDIX D FIELDNOTES

Soil Sampling Record Sheet

Client	NSW Government	Location ID: HA01
Project No.	0621304	
Project Name:	Albury RJP	

Start date	2/03/2022
Finish date	2/03/2022
Method:	Hand auger
Sampler Name:	Max Galbraith
Total depth (m)	0.2

<u>Depth (m)</u>	<u>Lithology Description</u>	<u>Sample details</u>	<u>Analysed (Y/N)</u>	<u>Comments</u>
0-0.2	Clayey silt, light brown, with orange mottling, damp, minor organics, hard/crumbly, slightly plastic in areas.	HA01_0.2	Y	No staining, no odour observed.

Other notes:
Sample located next to Visy pond.

Soil Sampling Record Sheet

Client	NSW Government	Location ID: HA02
Project No.	0621304	
Project Name:	Albury RJP	

Start date	2/03/2022
Finish date	2/03/2022
Method:	Hand auger
Sampler Name:	Max Galbraith
Total depth (m)	0.2

<u>Depth (m)</u>	<u>Lithology Description</u>	<u>Sample details</u>	<u>Analysed (Y/N)</u>	<u>Comments</u>
0-0.2	Silt, light brown, very crumbly, loose, medium-fine grain, slightly damp, minor organics.	HA02_0.2	Y	No staining, no odour observed.

Other notes:

Sample located to the side of an irrigated field

Soil Sampling Record Sheet

Client	NSW Government	Location ID: HA03
Project No.	0621304	
Project Name:	Albury RJP	

Start date	2/03/2022
Finish date	2/03/2022
Method:	Hand auger
Sampler Name:	Max Galbraith
Total depth (m)	0.2

<u>Depth (m)</u>	<u>Lithology Description</u>	<u>Sample details</u>	<u>Analysed (Y/N)</u>	<u>Comments</u>
0-0.2	Silt, light brown, hard, crumbly, fine grain, well sorted, minor organics, very minor small gravels	HA03_0.2	Y	No staining, no odour observed.

Other notes:

Sample located at an irrigated field

Soil Sampling Record Sheet

Client	NSW Government	Location ID: HA04
Project No.	0621304	
Project Name:	Albury RJP	

Start date	2/03/2022
Finish date	2/03/2022
Method:	Hand auger
Sampler Name:	Max Galbraith
Total depth (m)	0.2

<u>Depth (m)</u>	<u>Lithology Description</u>	<u>Sample details</u>	<u>Analysed (Y/N)</u>	<u>Comments</u>
0-0.2	Silty gravel with sand, brown/red with organics, slightly damp, poorly sorted with gravels from 2cm diameter to 2mm.	HA04_0.2	Y	No staining, no odour observed.

Soil Sampling Record Sheet

Client	NSW Government	Location ID: HA05
Project No.	0621304	
Project Name:	Albury RJP	

Start date	2/03/2022
Finish date	2/03/2022
Method:	Hand auger
Sampler Name:	Max Galbraith
Total depth (m)	0.2

<u>Depth (m)</u>	<u>Lithology Description</u>	<u>Sample details</u>	<u>Analysed (Y/N)</u>	<u>Comments</u>
0-0.2	Clayey silt, brown/red, moist, low plasticity to crumbly, very minor gravels and organics, clay increasing with depth.	HA05_0.2	Y	No staining, no odour observed.

Other notes:

Sample located at top of slope.

Soil Sampling Record Sheet

Client	NSW Government	Location ID: HA06
Project No.	0621304	
Project Name:	Albury RJP	

Start date	2/03/2022
Finish date	2/03/2022
Method:	Hand auger
Sampler Name:	Max Galbraith
Total depth (m)	0.2

<u>Depth (m)</u>	<u>Lithology Description</u>	<u>Sample details</u>	<u>Analysed (Y/N)</u>	<u>Comments</u>
0-0.2	Clayey silt with gravels, brown to orange/brown with minor angular gravels, moderate sorting, damp, friable/crumbly.	HA06_0.2	Y	No staining, no odour observed.

Other notes:

Sampled from cropping area

Soil Sampling Record Sheet

Client	NSW Government	Location ID: HA07
Project No.	0621304	
Project Name:	Albury RJP	

Start date	2/03/2022
Finish date	2/03/2022
Method:	Hand auger
Sampler Name:	Max Galbraith
Total depth (m)	0.5

<u>Depth (m)</u>	<u>Lithology Description</u>	<u>Sample details</u>	<u>Analysed (Y/N)</u>	<u>Comments</u>
0-0.5	Clayey silt, brown/red, damp, black crystalline inclusions, friable/crumby, very low plasticity, well sorted.	HA07_0.5	Y	No staining, no odour observed.

Other notes:
Sample located on side of road.

Soil Sampling Record Sheet

Client	NSW Government	Location ID: HA08
Project No.	0621304	
Project Name:	Albury RJP	

Start date	2/03/2022
Finish date	2/03/2022
Method:	Hand auger
Sampler Name:	Max Galbraith
Total depth (m)	0.2

<u>Depth (m)</u>	<u>Lithology Description</u>	<u>Sample details</u>	<u>Analysed (Y/N)</u>	<u>Comments</u>
0-0.2	Silt, light brown/grey, very fine, hard, crumbly, minor organics, homogenous, dry from 0.15m.	HA08_0.2	Y	No staining, no odour observed.

Other notes:
Sample located in a grazin paddock.

Soil Sampling Record Sheet

Client	NSW Government	Location ID: HA09
Project No.	0621304	
Project Name:	Albury RJP	

Start date	2/03/2022
Finish date	2/03/2022
Method:	Hand auger
Sampler Name:	Max Galbraith
Total depth (m)	0.2

<u>Depth (m)</u>	<u>Lithology Description</u>	<u>Sample details</u>	<u>Analysed (Y/N)</u>	<u>Comments</u>
0-0.2	Slit, light brown, hard, crumbly, very fine grain, minor organics, homogenous, dry from 0.15m.	HA05_0.2	Y	No staining, no odour observed.

Other notes:
Sample located in a grazing area.

Soil Sampling Record Sheet

Client	NSW Government	Location ID: HA10
Project No.	0621304	
Project Name:	Albury RJP	

Start date	2/03/2022
Finish date	2/03/2022
Method:	Hand auger
Sampler Name:	Max Galbraith
Total depth (m)	0.2

<u>Depth (m)</u>	<u>Lithology Description</u>	<u>Sample details</u>	<u>Analysed (Y/N)</u>	<u>Comments</u>
0-0.2	Silt, light brown, hard, crumbly, dry, organic inclusions, fine grain, well sorted.	HA05_0.2	Y	No staining, no odour observed.

Other notes:

Sample located in an easement/naturally vegetated grazing area next to a drainage channel.

Soil Sampling Record Sheet

Client	NSW Government	Location ID: HA11
Project No.	0621304	
Project Name:	Albury RJP	

Start date	2/03/2022
Finish date	2/03/2022
Method:	Hand auger
Sampler Name:	Max Galbraith
Total depth (m)	0.2

<u>Depth (m)</u>	<u>Lithology Description</u>	<u>Sample details</u>	<u>Analysed (Y/N)</u>	<u>Comments</u>
0-0.2	Silt, brown, medium hard, crumbly, damp, organic inclusions, well sorted, homogenous, minor gravels.	HA11_0.2	Y	No staining, no odour observed.

Other notes:

Sample located in an irrigated grazing area

Soil Sampling Record Sheet

Client	NSW Government	Location ID: HA12
Project No.	0621304	
Project Name:	Albury RJP	

Start date	2/03/2022
Finish date	2/03/2022
Method:	Hand auger
Sampler Name:	Max Galbraith
Total depth (m)	0.5

<u>Depth (m)</u>	<u>Lithology Description</u>	<u>Sample details</u>	<u>Analysed (Y/N)</u>	<u>Comments</u>
0-0.3	Silt, light brown, minor angular gravels up to 10mm, loose, fine grained, slightly moist.	HA12_0.2	Y	No staining, no odour observed.
0.3-0.5	Silt, brown with red-orange mottling, crumbly, low plasticity, minor gravels, fine grain.	HA12_0.5	Y	No staining, no odour observed.

Other notes:

Sample located in an irrigated grazing area.

Soil Sampling Record Sheet

Client	NSW Government	Location ID: HA13
Project No.	0621304	
Project Name:	Albury RJP	

Start date	2/03/2022
Finish date	2/03/2022
Method:	Hand auger
Sampler Name:	Max Galbraith
Total depth (m)	0.2

<u>Depth (m)</u>	<u>Lithology Description</u>	<u>Sample details</u>	<u>Analysed (Y/N)</u>	<u>Comments</u>
0-0.2	Silt, brown, hard, crumbly, damp, homogenous organic inclusions, well sorted, fine grained.	HA13_0.1	Y	No staining, no odour observed.

Other notes:
Sample located in a grazing area.

Soil Sampling Record Sheet

Client	NSW Government	Location ID: HA14
Project No.	0621304	
Project Name:	Albury RJP	

Start date	2/03/2022
Finish date	2/03/2022
Method:	Hand auger
Sampler Name:	Max Galbraith
Total depth (m)	0.2

<u>Depth (m)</u>	<u>Lithology Description</u>	<u>Sample details</u>	<u>Analysed (Y/N)</u>	<u>Comments</u>
0-0.2	Silt, brown, soft, damp, minor small gravels, homogenous, well sorted, organic inclusions.	HA14_0.2	Y	No staining, no odour observed.

Other notes:

Sample located in field near dying trees.

Soil Sampling Record Sheet

Client	NSW Government	Location ID: HA15
Project No.	0621304	
Project Name:	Albury RJP	

Start date	2/03/2022
Finish date	2/03/2022
Method:	Hand auger
Sampler Name:	Max Galbraith
Total depth (m)	0.5

<u>Depth (m)</u>	<u>Lithology Description</u>	<u>Sample details</u>	<u>Analysed (Y/N)</u>	<u>Comments</u>
0-0.2	Clay, hard, brown-grey with red-yellow mottling, major organics, well sorted, gravel inclusions. Saturated at 0.5m.	HA15_0.5	Y	No odour observed. Organic staining 0.1 to 0.5 m.

Other notes:

Sample located near a drainage area.

Soil Sampling Record Sheet

Client	NSW Government	Location ID: HA16
Project No.	0621304	
Project Name:	Albury RJP	

Start date	2/03/2022
Finish date	2/03/2022
Method:	Hand auger
Sampler Name:	Max Galbraith
Total depth (m)	0.2

<u>Depth (m)</u>	<u>Lithology Description</u>	<u>Sample details</u>	<u>Analysed (Y/N)</u>	<u>Comments</u>
0-0.2	Clayey silt, red/brown, soft, crumbly, low plasticity, damp, homogenous, organic inclusions.	HA16_0.2	Y	No staining, no odour observed.

Other notes:

Sampled from an irrigated grazing area.

Soil Sampling Record Sheet

Client	NSW Government	Location ID: HA17
Project No.	0621304	
Project Name:	Albury RJP	

Start date	2/03/2022
Finish date	2/03/2022
Method:	Hand auger
Sampler Name:	Max Galbraith
Total depth (m)	0.2

<u>Depth (m)</u>	<u>Lithology Description</u>	<u>Sample details</u>	<u>Analysed (Y/N)</u>	<u>Comments</u>
0-0.5	Silt, light brown, minor gravels, medium hard, crumbly dry/slightly damp, homogenous.	HA17_0.2	Y	No staining, no odour observed.

Other notes:

Sample located in an irrigated area, pine plantation

Soil Sampling Record Sheet

Client	NSW Government	Location ID: HA18
Project No.	0621304	
Project Name:	Albury RJP	

Start date	2/03/2022
Finish date	2/03/2022
Method:	Hand auger
Sampler Name:	Max Galbraith
Total depth (m)	0.5

<u>Depth (m)</u>	<u>Lithology Description</u>	<u>Sample details</u>	<u>Analysed (Y/N)</u>	<u>Comments</u>
0-0.5	Silty clay, brown with slight dark yellow/orange inclusions, very hard, damp.	HA18_0.5	Y	No staining, no odour observed.

Other notes:

Sample located in an irrigated plantation area.

Soil Sampling Record Sheet

Client	NSW Government	Location ID: HA19
Project No.	0621304	
Project Name:	Albury RJP	

Start date	2/03/2022
Finish date	2/03/2022
Method:	Hand auger
Sampler Name:	Max Galbraith
Total depth (m)	0.2

<u>Depth (m)</u>	<u>Lithology Description</u>	<u>Sample details</u>	<u>Analysed (Y/N)</u>	<u>Comments</u>
0-0.2	Clayey silt, dark brown, damp, lighter inclusions, moderate plasticity, friable, organic inclusions.	HA19_0.2 D01_220302	Y	No staining, no odour observed.

Other notes:

Sample located in an irrigated plantation area (under radiata pines).

Soil Sampling Record Sheet

Client	NSW Government	Location ID: HA20
Project No.	0621304	
Project Name:	Albury RJP	

Start date	2/03/2022
Finish date	2/03/2022
Method:	Hand auger
Sampler Name:	Max Galbraith
Total depth (m)	0.2

<u>Depth (m)</u>	<u>Lithology Description</u>	<u>Sample details</u>		<u>Analysed (Y/N)</u>	<u>Comments</u>
0-0.2	Silt, grey, dry. Loose with hard friable pieces.	HA20_0.2 D02_220302		Y	No staining, no odour observed.

Other notes:

Sample located in an area of bare ground.

APPENDIX E LABORATORY CERTIFICATES

Company		ERM		Project No	0621304		Project Manager	Peter Lavalle		Sampler(s)	Max Galbraith	
Address		Level 1, 45 Watt St, Newcastle, 2300		Project Name	Etamogah Salinity and ASS soil Investigation		EDD Format (ESdat, EQuIS, Custom)	Eesdat		Handed over by	M Galbraith	
Contact Name		Max Galbraith		Analyses <small>All items need to be analysed by a specialist lab. Contact your analyst for more information.</small>	Ion exchange	aggressivity	Chromium Reducible Sulphur Sulfide			Containers		Turnaround Time (TAT)
Phone No		468384969								Requirements: Default unless specified otherwise		
Special Directions										<input type="checkbox"/> Overnight (8am)* <input type="checkbox"/> 1 Day* <input type="checkbox"/> 2 Day* <input type="checkbox"/> 3 Day* <input type="checkbox"/> 5 Day* *Surcharges apply		
Purchase Order		0621304								1L Plastic 500mL Plastic 100mL Plastic 50mL Preserved Inorganic Plastic Bottle 50mL Lids/Seal Preserved Plastic 50mL Inorganic Plastic Jar (Glass or HDPE) Other (Specify Analysis, VAS, Guidelines)		
Quote ID No		Std. ERM quote								Sample Comments / Dangerous Goods Hazard Warning		
No	Client Sample ID	Sampled Date/Time (dd/mm/yy hh:mm)	Matrix (Solid (S) Water (W))									
1	HA01_0.2	2/03/22	S	X	X	X						
2	HA02_0.2	2/03/22	S	X	X	X						
3	HA03_0.2	2/03/22	S	X	X	X						
4	HA04_0.2	2/03/22	S	X	X	X						
5	HA05_0.2	2/03/22	S	X	X	X						
6	HA05_0.2	2/03/22	S	X	X	X						
7	HA07_0.5	2/03/22	S	X	X	X						
8	HA08_0.2	2/03/22	S	X	X	X						
9	HA09_0.2	2/03/22	S	X	X	X						
10	HA10_0.2	2/03/22	S	X	X	X						
11	HA11_0.2	2/03/22	S	X	X	X						
12	HA12_0.2	2/03/22	S	X	X	X						
13	HA12_0.5	2/03/22	S	X	X	X						
14	HA13_0.1	2/03/22	S	X	X	X						
15	HA14_0.2	2/03/22	S	X	X	X						
16	HA15_0.5	2/03/22	S	X	X	X						
17	HA16_0.2	2/03/22	S	X	X	X						
18	HA17_0.2	2/03/22	S	X	X	X						
19	HA18_0.5	2/03/22	S	X	X	X						
20	HA19_0.2	2/03/22	S	X	X	X						
21	HA20_0.2	2/03/22	S	X	X	X						
22	D01_220302	2/03/22	S	X	X	X						
23	D02_220302	2/03/22	S	X	X	X						
Total Counts				22	22	22						
Method of Shipment	Courier - Collected from site by Eurofins		Hand Delivered	Postal	Name	Signature	MG	Date	3/3/2022 0:00	Time	13:00	
Eurofins mg Laboratory Use Only	Received By	RP Phillips		SYD BNE MEL PER ADL NTL DRW	Signature		Date	3/3/22	Time	7:59pm	Temperature	4.48
	Received By			SYD BNE MEL PER ADL NTL DRW	Signature		Date		Time		Report No	#868466

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Lane Cove West NSW 2066
Phone : +61 2 9900 8400
NATA # 1261 Site # 18217

Brisbane
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Phone : +61 7 3902 4600
NATA # 1261 Site # 20794

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4/52 Industrial Drive
Mayfield East NSW 2304
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Phone : +61 2 4968 8448
NATA # 1261 Site # 25079

Eurofins ARL Pty Ltd

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Phone : +61 8 6253 4444
NATA # 2377 Site # 2370

Eurofins Environment Testing NZ Limited

NZBN: 9429046024954

Auckland
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Penrose, Auckland 1061
Phone : +64 9 526 45 51
IANZ # 1327

Christchurch
43 Detroit Drive
Rolleston, Christchurch 7675
Phone : 0800 856 450
IANZ # 1290

Sample Receipt Advice

Company name: ERM Hunter Valley
Contact name: Peter Lavelle
Project name: ETAMOGAH SALINITY AND ASS SOIL INVESTIGATION
Project ID: 0621304
Turnaround time: 3 Day
Date/Time received: Mar 3, 2022 7:59 PM
Eurofins reference: 868466

Sample Information

- ✓ A detailed list of analytes logged into our LIMS, is included in the attached summary table.
- ✓ Sample Temperature of chilled sample on the batch as recorded by Eurofins Sample Receipt : 4.4 degrees Celsius.
- ✓ All samples have been received as described on the above COC.
- ✓ COC has been completed correctly.
- ✓ Attempt to chill was evident.
- ✓ Appropriately preserved sample containers have been used.
- ✓ All samples were received in good condition.
- ✓ Samples have been provided with adequate time to commence analysis in accordance with the relevant holding times.
- ✓ Appropriate sample containers have been used.
- ✓ Sample containers for volatile analysis received with zero headspace.
- ✗ Split sample sent to requested external lab.
- ✗ Some samples have been subcontracted.
- N/A Custody Seals intact (if used).

Notes

HA12_0.2 jar received broken, all analysis to be run from bag. Fastest TAT for CRS Suite analysis is 3 days. Samples received by the laboratory after 5.30pm are deemed to have been received the following working day.

Contact

If you have any questions with respect to these samples, please contact your Analytical Services Manager:

Andrew Black on phone : (+61) 2 9900 8490 or by email: AndrewBlack@eurofins.com

Results will be delivered electronically via email to Peter Lavelle - peter.lavelle@erm.com.

Note: A copy of these results will also be delivered to the general ERM Hunter Valley email address.

Company Name: ERM Hunter Valley
Address: Level 1 / 45 Watt Street
Newcastle
NSW 2300

Order No.: 621304
Report #: 868466
Phone: (02) 4964 2150
Fax: (02) 4964 2152

Received: Mar 3, 2022 7:59 PM
Due: Mar 9, 2022
Priority: 3 Day
Contact Name: Peter Lavelle

Project Name: ETAMOGAH SALINITY AND ASS SOIL INVESTIGATION
Project ID: 0621304

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Aggressivity Soil Set	Aggressivity Soil Set	Exchangeable Cations	Chromium Reducible Sulfur Suite	Moisture Set	Moisture Set
Melbourne Laboratory - NATA # 1261 Site # 1254						X	X	X		X	X
Sydney Laboratory - NATA # 1261 Site # 18217						X	X	X		X	X
Brisbane Laboratory - NATA # 1261 Site # 20794									X		
Mayfield Laboratory - NATA # 1261 Site # 25079											
Perth Laboratory - NATA # 2377 Site # 2370											
External Laboratory											
No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID						
1	HA01_0.2	Mar 02, 2022		Soil	S22-Ma08611	X	X	X		X	
2	HA02_0.2	Mar 02, 2022		Soil	S22-Ma08612	X	X	X		X	
3	HA03_0.2	Mar 02, 2022		Soil	S22-Ma08613	X	X	X		X	
4	HA04_0.2	Mar 02, 2022		Soil	S22-Ma08614	X	X	X		X	
5	HA05_0.2	Mar 02, 2022		Soil	S22-Ma08615	X	X	X		X	
6	HA06_0.2	Mar 02, 2022		Soil	S22-Ma08616	X	X	X		X	
7	HA07_0.5	Mar 02, 2022		Soil	S22-Ma08617	X	X	X		X	
8	HA08_0.2	Mar 02, 2022		Soil	S22-Ma08618	X	X	X		X	
9	HA09_0.2	Mar 02, 2022		Soil	S22-Ma08619	X	X	X		X	

Company Name:	ERM Hunter Valley	Order No.:	621304	Received:	Mar 3, 2022 7:59 PM
Address:	Level 1 / 45 Watt Street Newcastle NSW 2300	Report #:	868466	Due:	Mar 9, 2022
Project Name:	ETAMOGAH SALINITY AND ASS SOIL INVESTIGATION	Phone:	(02) 4964 2150	Priority:	3 Day
Project ID:	0621304	Fax:	(02) 4964 2152	Contact Name:	Peter Lavelle

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Aggressivity Soil Set	Aggressivity Soil Set	Exchangeable Cations	Chromium Reducible Sulfur Suite	Moisture Set	Moisture Set
Melbourne Laboratory - NATA # 1261 Site # 1254						X	X	X		X	X
Sydney Laboratory - NATA # 1261 Site # 18217						X	X	X		X	X
Brisbane Laboratory - NATA # 1261 Site # 20794									X		
Mayfield Laboratory - NATA # 1261 Site # 25079											
Perth Laboratory - NATA # 2377 Site # 2370											
External Laboratory											
10	HA10_0.2	Mar 02, 2022		Soil	S22-Ma08620		X	X	X		X
11	HA11_0.2	Mar 02, 2022		Soil	S22-Ma08621		X	X	X		X
12	HA12_0.2	Mar 02, 2022		Soil	S22-Ma08622	X		X	X	X	
13	HA12_0.5	Mar 02, 2022		Soil	S22-Ma08623		X	X	X		X
14	HA13_0.1	Mar 02, 2022		Soil	S22-Ma08624		X	X	X		X
15	HA14_0.2	Mar 02, 2022		Soil	S22-Ma08625		X	X	X		X
16	HA15_0.5	Mar 02, 2022		Soil	S22-Ma08626		X	X	X		X
17	HA16_0.2	Mar 02, 2022		Soil	S22-Ma08627		X	X	X		X
18	HA17_0.2	Mar 02, 2022		Soil	S22-Ma08628		X	X	X		X
19	HA18_0.5	Mar 02, 2022		Soil	S22-Ma08629		X	X	X		X
20	HA19_0.2	Mar 02, 2022		Soil	S22-Ma08630		X	X	X		X



Environment Testing

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web: www.eurofins.com.au
email: EnviroSales@eurofins.com

Company Name: ERM Hunter Valley
Address: Level 1 / 45 Watt Street
Newcastle
NSW 2300

Order No.: 621304
Report #: 868466
Phone: (02) 4964 2150
Fax: (02) 4964 2152

Received: Mar 3, 2022 7:59 PM
Due: Mar 9, 2022
Priority: 3 Day
Contact Name: Peter Lavelle

Project Name: ETAMOGAH SALINITY AND ASS SOIL INVESTIGATION
Project ID: 0621304

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Aggressivity Soil Set	Aggressivity Soil Set	Exchangeable Cations	Chromium Reducible Sulfur Suite	Moisture Set	Moisture Set
Melbourne Laboratory - NATA # 1261 Site # 1254						X	X	X		X	X
Sydney Laboratory - NATA # 1261 Site # 18217						X	X	X		X	X
Brisbane Laboratory - NATA # 1261 Site # 20794									X		
Mayfield Laboratory - NATA # 1261 Site # 25079											
Perth Laboratory - NATA # 2377 Site # 2370											
External Laboratory											
21	HA20_0.2	Mar 02, 2022		Soil	S22-Ma08631		X	X	X		X
22	D01_220302	Mar 02, 2022		Soil	S22-Ma08632		X	X	X		X
23	D02_220302	Mar 02, 2022		Soil	S22-Ma08633		X	X	X		X
Test Counts						23	23	23	23	23	23

ERM Hunter Valley
Level 1 / 45 Watt Street
Newcastle
NSW 2300



NATA Accredited
Accreditation Number 1261
Site Number 20794

Accredited for compliance with ISO/IEC 17025 – Testing
NATA is a signatory to the ILAC Mutual Recognition
Arrangement for the mutual recognition of the
equivalence of testing, medical testing, calibration,
inspection, proficiency testing scheme providers and
reference materials producers reports and certificates.

Attention: **Peter Lavelle**

Report **868466-S**
Project name **ETAMOGAH SALINITY AND ASS SOIL INVESTIGATION**
Project ID **0621304**
Received Date **Mar 03, 2022**

Client Sample ID			HA01_0.2	HA02_0.2	HA03_0.2	HA04_0.2
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S22-Ma08611	S22-Ma08612	S22-Ma08613	S22-Ma08614
Date Sampled			Mar 02, 2022	Mar 02, 2022	Mar 02, 2022	Mar 02, 2022
Test/Reference	LOR	Unit				
Chloride	10	mg/kg	< 10	< 10	< 10	< 10
Conductivity (1:5 aqueous extract at 25°C as rec.)	10	uS/cm	30	< 10	49	12
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	5.9	5.7	8.7	6.3
Resistivity*	0.5	ohm.m	330	1400	210	870
Sulphate (as SO4)	10	mg/kg	37	< 10	11	< 10
Magnesium (exchangeable)	0.1	meq/100g	9.9	0.2	2.6	4.1
Potassium (exchangeable)	0.1	meq/100g	0.8	0.3	0.2	0.4
Sodium (exchangeable)	0.1	meq/100g	1.0	< 0.1	1.3	< 0.1
% Moisture	1	%	19	15	13	11
Cation Exchange Capacity						
Calcium (exchangeable)	0.1	meq/100g	4.6	1.2	7.1	4.4
Actual Acidity (NLM-3.2)						
pH-KCL (NLM-3.1)	0.1	pH Units	4.5	5.3	6.6	6.0
Titrateable Actual Acidity (NLM-3.2)	2	mol H+/t	48	5.0	< 2	4.0
Titrateable Actual Acidity (NLM-3.2)	0.003	% pyrite S	0.080	0.010	< 0.003	0.010
Potential Acidity - Chromium Reducible Sulfur						
Chromium Reducible Sulfur (s-SCr) (NLM-2.1) ^{S04}	0.005	% S	< 0.005	< 0.005	< 0.005	< 0.005
Chromium Reducible Sulfur (a-SCr) (NLM-2.1)	3	mol H+/t	< 3	< 3	< 3	< 3
Extractable Sulfur						
Sulfur - KCl Extractable	0.005	% S	< 0.005	N/A	N/A	N/A
HCl Extractable Sulfur	0.005	% S	< 0.005	N/A	N/A	N/A
Retained Acidity (S-NAS)						
Net Acid soluble sulfur (SNAS) NLM-4.1	0.02	% S	< 0.02	N/A	N/A	N/A
Net Acid soluble sulfur (s-SNAS) NLM-4.1 ^{S02}	0.02	% S	< 0.02	N/A	N/A	N/A
Net Acid soluble sulfur (a-SNAS) NLM-4.1	10	mol H+/t	< 10	N/A	N/A	N/A
HCl Extractable Sulfur Correction Factor	1	factor	2.0	2.0	2.0	2.0
Acid Neutralising Capacity (ANCbt)						
Acid Neutralising Capacity - (ANCbt) (NLM-5.2)	0.01	% CaCO3	N/A	N/A	0.43	N/A
Acid Neutralising Capacity - (s-ANCbt) (NLM-5.2) ^{S03}	0.02	% S	N/A	N/A	0.14	N/A
Acid Neutralising Capacity - (a-ANCbt) (NLM-5.2)	2	mol H+/t	N/A	N/A	85	N/A
ANC Fineness Factor		factor	1.5	1.5	1.5	1.5
Net Acidity (Including ANC)						
CRS Suite - Net Acidity - NASSG (Including ANC)	0.02	% S	0.08	< 0.02	< 0.02	< 0.02
CRS Suite - Net Acidity - NASSG (Including ANC)	10	mol H+/t	48	< 10	< 10	< 10
CRS Suite - Liming Rate - NASSG (Including ANC) ^{S01}	1	kg CaCO3/t	3.6	< 1	< 1	< 1

Client Sample ID			HA01_0.2	HA02_0.2	HA03_0.2	HA04_0.2
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S22-Ma08611	S22-Ma08612	S22-Ma08613	S22-Ma08614
Date Sampled			Mar 02, 2022	Mar 02, 2022	Mar 02, 2022	Mar 02, 2022
Test/Reference	LOR	Unit				
Extraneous Material						
<2mm Fraction	0.005	g	140	100	160	130
>2mm Fraction	0.005	g	5.5	< 0.005	18	39
Analysed Material	0.1	%	96	100	90	77
Extraneous Material	0.1	%	3.8	< 0.1	10	23

Client Sample ID			HA05_0.2	HA06_0.2	HA07_0.5	HA08_0.2
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S22-Ma08615	S22-Ma08616	S22-Ma08617	S22-Ma08618
Date Sampled			Mar 02, 2022	Mar 02, 2022	Mar 02, 2022	Mar 02, 2022
Test/Reference	LOR	Unit				
Chloride						
Chloride	10	mg/kg	< 10	< 10	< 10	< 10
Conductivity (1:5 aqueous extract at 25°C as rec.)						
Conductivity (1:5 aqueous extract at 25°C as rec.)	10	uS/cm	10	13	11	10
pH (1:5 Aqueous extract at 25°C as rec.)						
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	5.8	7.1	5.3	5.6
Resistivity*						
Resistivity*	0.5	ohm.m	980	790	930	970
Sulphate (as SO4)						
Sulphate (as SO4)	10	mg/kg	< 10	11	16	11
Magnesium (exchangeable)						
Magnesium (exchangeable)	0.1	meq/100g	1.1	0.6	4.2	0.3
Potassium (exchangeable)						
Potassium (exchangeable)	0.1	meq/100g	0.6	0.3	0.3	< 0.1
Sodium (exchangeable)						
Sodium (exchangeable)	0.1	meq/100g	< 0.1	< 0.1	< 0.1	< 0.1
% Moisture						
% Moisture	1	%	14	14	21	7.3
Cation Exchange Capacity						
Calcium (exchangeable)	0.1	meq/100g	1.2	4.0	2.7	1.9
Actual Acidity (NLM-3.2)						
pH-KCL (NLM-3.1)						
pH-KCL (NLM-3.1)	0.1	pH Units	4.6	6.0	4.4	5.0
Titrateable Actual Acidity (NLM-3.2)						
Titrateable Actual Acidity (NLM-3.2)	2	mol H+/t	30	3.0	55	10
Titrateable Actual Acidity (NLM-3.2)	0.003	% pyrite S	0.050	< 0.003	0.090	0.020
Potential Acidity - Chromium Reducible Sulfur						
Chromium Reducible Sulfur (s-SCr) (NLM-2.1)^{S04}						
Chromium Reducible Sulfur (s-SCr) (NLM-2.1) ^{S04}	0.005	% S	< 0.005	< 0.005	< 0.005	< 0.005
Chromium Reducible Sulfur (a-SCr) (NLM-2.1)						
Chromium Reducible Sulfur (a-SCr) (NLM-2.1)	3	mol H+/t	< 3	< 3	< 3	< 3
Extractable Sulfur						
Sulfur - KCl Extractable						
Sulfur - KCl Extractable	0.005	% S	N/A	N/A	< 0.005	N/A
HCl Extractable Sulfur						
HCl Extractable Sulfur	0.005	% S	N/A	N/A	< 0.005	N/A
Retained Acidity (S-NAS)						
Net Acid soluble sulfur (SNAS) NLM-4.1						
Net Acid soluble sulfur (SNAS) NLM-4.1	0.02	% S	N/A	N/A	< 0.02	N/A
Net Acid soluble sulfur (s-SNAS) NLM-4.1^{S02}						
Net Acid soluble sulfur (s-SNAS) NLM-4.1 ^{S02}	0.02	% S	N/A	N/A	< 0.02	N/A
Net Acid soluble sulfur (a-SNAS) NLM-4.1						
Net Acid soluble sulfur (a-SNAS) NLM-4.1	10	mol H+/t	N/A	N/A	< 10	N/A
HCl Extractable Sulfur Correction Factor						
HCl Extractable Sulfur Correction Factor	1	factor	2.0	2.0	2.0	2.0
Acid Neutralising Capacity (ANCbt)						
Acid Neutralising Capacity - (ANCbt) (NLM-5.2)						
Acid Neutralising Capacity - (ANCbt) (NLM-5.2)	0.01	% CaCO3	N/A	N/A	N/A	N/A
Acid Neutralising Capacity - (s-ANCbt) (NLM-5.2)^{S03}						
Acid Neutralising Capacity - (s-ANCbt) (NLM-5.2) ^{S03}	0.02	% S	N/A	N/A	N/A	N/A
Acid Neutralising Capacity - (a-ANCbt) (NLM-5.2)						
Acid Neutralising Capacity - (a-ANCbt) (NLM-5.2)	2	mol H+/t	N/A	N/A	N/A	N/A
ANC Fineness Factor						
ANC Fineness Factor		factor	1.5	1.5	1.5	1.5
Net Acidity (Including ANC)						
CRS Suite - Net Acidity - NASSG (Including ANC)						
CRS Suite - Net Acidity - NASSG (Including ANC)	0.02	% S	0.05	< 0.02	0.09	0.02
CRS Suite - Net Acidity - NASSG (Including ANC)						
CRS Suite - Net Acidity - NASSG (Including ANC)	10	mol H+/t	30	< 10	55	10
CRS Suite - Liming Rate - NASSG (Including ANC)^{S01}						
CRS Suite - Liming Rate - NASSG (Including ANC) ^{S01}	1	kg CaCO3/t	2.3	< 1	4.2	< 1

Client Sample ID			HA05_0.2	HA06_0.2	HA07_0.5	HA08_0.2
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S22-Ma08615	S22-Ma08616	S22-Ma08617	S22-Ma08618
Date Sampled			Mar 02, 2022	Mar 02, 2022	Mar 02, 2022	Mar 02, 2022
Test/Reference	LOR	Unit				
Extraneous Material						
<2mm Fraction	0.005	g	240	130	110	100
>2mm Fraction	0.005	g	21	48	4.2	13
Analysed Material	0.1	%	92	73	96	89
Extraneous Material	0.1	%	8.0	27	3.8	11

Client Sample ID			HA09_0.2	HA10_0.2	HA11_0.2	HA12_0.2
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S22-Ma08619	S22-Ma08620	S22-Ma08621	S22-Ma08622
Date Sampled			Mar 02, 2022	Mar 02, 2022	Mar 02, 2022	Mar 02, 2022
Test/Reference	LOR	Unit				
Chloride						
Chloride	10	mg/kg	< 10	< 10	< 10	-
Conductivity (1:5 aqueous extract at 25°C as rec.)						
Conductivity (1:5 aqueous extract at 25°C as rec.)	10	uS/cm	< 10	12	12	-
pH (1:5 Aqueous extract at 25°C as rec.)						
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	5.6	6.5	7.0	-
Resistivity*						
Resistivity*	0.5	ohm.m	1100	850	840	-
Sulphate (as SO4)						
Sulphate (as SO4)	10	mg/kg	< 10	< 10	< 10	-
Magnesium (exchangeable)						
Magnesium (exchangeable)	0.1	meq/100g	5.5	0.7	0.9	-
Potassium (exchangeable)						
Potassium (exchangeable)	0.1	meq/100g	0.5	0.2	0.5	-
Sodium (exchangeable)						
Sodium (exchangeable)	0.1	meq/100g	5.4	0.1	< 0.1	-
% Moisture						
% Moisture	1	%	14	16	7.7	-
Cation Exchange Capacity						
Calcium (exchangeable)	0.1	meq/100g	3.8	0.9	4.9	-
Actual Acidity (NLM-3.2)						
pH-KCL (NLM-3.1)						
pH-KCL (NLM-3.1)	0.1	pH Units	4.9	5.5	5.9	6.8
Titration Actual Acidity (NLM-3.2)						
Titration Actual Acidity (NLM-3.2)	2	mol H+/t	16	5.0	3.0	< 2
Titration Actual Acidity (NLM-3.2)	0.003	% pyrite S	0.030	0.010	< 0.003	< 0.003
Potential Acidity - Chromium Reducible Sulfur						
Chromium Reducible Sulfur (s-SCr) (NLM-2.1)^{S04}						
Chromium Reducible Sulfur (s-SCr) (NLM-2.1) ^{S04}	0.005	% S	< 0.005	< 0.005	< 0.005	< 0.005
Chromium Reducible Sulfur (a-SCr) (NLM-2.1)						
Chromium Reducible Sulfur (a-SCr) (NLM-2.1)	3	mol H+/t	< 3	< 3	< 3	< 3
Extractable Sulfur						
Sulfur - KCl Extractable	0.005	% S	N/A	N/A	N/A	N/A
HCl Extractable Sulfur	0.005	% S	N/A	N/A	N/A	N/A
Retained Acidity (S-NAS)						
Net Acid Soluble Sulfur (SNAS) NLM-4.1						
Net Acid Soluble Sulfur (SNAS) NLM-4.1	0.02	% S	N/A	N/A	N/A	N/A
Net Acid Soluble Sulfur (s-SNAS) NLM-4.1^{S02}						
Net Acid Soluble Sulfur (s-SNAS) NLM-4.1 ^{S02}	0.02	% S	N/A	N/A	N/A	N/A
Net Acid Soluble Sulfur (a-SNAS) NLM-4.1						
Net Acid Soluble Sulfur (a-SNAS) NLM-4.1	10	mol H+/t	N/A	N/A	N/A	N/A
HCl Extractable Sulfur Correction Factor						
HCl Extractable Sulfur Correction Factor	1	factor	2.0	2.0	2.0	2.0
Acid Neutralising Capacity (ANCbt)						
Acid Neutralising Capacity - (ANCbt) (NLM-5.2)						
Acid Neutralising Capacity - (ANCbt) (NLM-5.2)	0.01	% CaCO3	N/A	N/A	N/A	0.25
Acid Neutralising Capacity - (s-ANCbt) (NLM-5.2)^{S03}						
Acid Neutralising Capacity - (s-ANCbt) (NLM-5.2) ^{S03}	0.02	% S	N/A	N/A	N/A	0.08
Acid Neutralising Capacity - (a-ANCbt) (NLM-5.2)						
Acid Neutralising Capacity - (a-ANCbt) (NLM-5.2)	2	mol H+/t	N/A	N/A	N/A	49
ANC Fineness Factor						
ANC Fineness Factor		factor	1.5	1.5	1.5	1.5
Net Acidity (Including ANC)						
CRS Suite - Net Acidity - NASSG (Including ANC)						
CRS Suite - Net Acidity - NASSG (Including ANC)	0.02	% S	0.03	< 0.02	< 0.02	< 0.02
CRS Suite - Net Acidity - NASSG (Including ANC)						
CRS Suite - Net Acidity - NASSG (Including ANC)	10	mol H+/t	16	< 10	< 10	< 10
CRS Suite - Liming Rate - NASSG (Including ANC)^{S01}						
CRS Suite - Liming Rate - NASSG (Including ANC) ^{S01}	1	kg CaCO3/t	1.2	< 1	< 1	< 1

Client Sample ID			HA09_0.2	HA10_0.2	HA11_0.2	HA12_0.2
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S22-Ma08619	S22-Ma08620	S22-Ma08621	S22-Ma08622
Date Sampled			Mar 02, 2022	Mar 02, 2022	Mar 02, 2022	Mar 02, 2022
Test/Reference	LOR	Unit				
Extraneous Material						
<2mm Fraction	0.005	g	130	240	230	110
>2mm Fraction	0.005	g	17	11	14	21
Analysed Material	0.1	%	88	95	94	84
Extraneous Material	0.1	%	12	4.5	5.8	16

Client Sample ID			HA12_0.5	HA13_0.1	HA14_0.2	HA15_0.5
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S22-Ma08623	S22-Ma08624	S22-Ma08625	S22-Ma08626
Date Sampled			Mar 02, 2022	Mar 02, 2022	Mar 02, 2022	Mar 02, 2022
Test/Reference	LOR	Unit				
Chloride						
	10	mg/kg	14	< 10	< 10	< 10
Conductivity (1:5 aqueous extract at 25°C as rec.)						
	10	uS/cm	99	38	41	56
pH (1:5 Aqueous extract at 25°C as rec.)						
	0.1	pH Units	8.3	7.3	5.9	6.5
Resistivity*						
	0.5	ohm.m	100	260	240	180
Sulphate (as SO4)						
	10	mg/kg	110	12	16	32
Magnesium (exchangeable)						
	0.1	meq/100g	< 0.1	1.0	2.1	12
Potassium (exchangeable)						
	0.1	meq/100g	0.1	0.8	1.2	1.6
Sodium (exchangeable)						
	0.1	meq/100g	< 0.1	< 0.1	< 0.1	1.1
% Moisture						
	1	%	22	14	16	19
Cation Exchange Capacity						
Calcium (exchangeable)	0.1	meq/100g	1.3	6.8	3.6	6.7
Actual Acidity (NLM-3.2)						
pH-KCL (NLM-3.1)	0.1	pH Units	5.5	6.6	5.0	4.9
Titrateable Actual Acidity (NLM-3.2)	2	mol H+/t	13	< 2	13	20
Titrateable Actual Acidity (NLM-3.2)	0.003	% pyrite S	0.020	< 0.003	0.020	0.030
Potential Acidity - Chromium Reducible Sulfur						
Chromium Reducible Sulfur (s-SCr) (NLM-2.1) ^{S04}	0.005	% S	< 0.005	< 0.005	< 0.005	< 0.005
Chromium Reducible Sulfur (a-SCr) (NLM-2.1)	3	mol H+/t	< 3	< 3	< 3	< 3
Extractable Sulfur						
Sulfur - KCl Extractable	0.005	% S	N/A	N/A	N/A	N/A
HCl Extractable Sulfur	0.005	% S	N/A	N/A	N/A	N/A
Retained Acidity (S-NAS)						
Net Acid soluble sulfur (SNAS) NLM-4.1	0.02	% S	N/A	N/A	N/A	N/A
Net Acid soluble sulfur (s-SNAS) NLM-4.1 ^{S02}	0.02	% S	N/A	N/A	N/A	N/A
Net Acid soluble sulfur (a-SNAS) NLM-4.1	10	mol H+/t	N/A	N/A	N/A	N/A
HCl Extractable Sulfur Correction Factor	1	factor	2.0	2.0	2.0	2.0
Acid Neutralising Capacity (ANCbt)						
Acid Neutralising Capacity - (ANCbt) (NLM-5.2)	0.01	% CaCO3	N/A	0.45	N/A	N/A
Acid Neutralising Capacity - (s-ANCbt) (NLM-5.2) ^{S03}	0.02	% S	N/A	0.15	N/A	N/A
Acid Neutralising Capacity - (a-ANCbt) (NLM-5.2)	2	mol H+/t	N/A	91	N/A	N/A
ANC Fineness Factor		factor	1.5	1.5	1.5	1.5
Net Acidity (Including ANC)						
CRS Suite - Net Acidity - NASSG (Including ANC)	0.02	% S	0.02	< 0.02	0.02	0.03
CRS Suite - Net Acidity - NASSG (Including ANC)	10	mol H+/t	13	< 10	13	20
CRS Suite - Liming Rate - NASSG (Including ANC) ^{S01}	1	kg CaCO3/t	1.0	< 1	< 1	1.5

Client Sample ID			HA12_0.5	HA13_0.1	HA14_0.2	HA15_0.5
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S22-Ma08623	S22-Ma08624	S22-Ma08625	S22-Ma08626
Date Sampled			Mar 02, 2022	Mar 02, 2022	Mar 02, 2022	Mar 02, 2022
Test/Reference	LOR	Unit				
Extraneous Material						
<2mm Fraction	0.005	g	100	230	190	120
>2mm Fraction	0.005	g	3.7	7.1	13	27
Analysed Material	0.1	%	97	97	93	82
Extraneous Material	0.1	%	3.4	3.0	6.7	18

Client Sample ID			HA16_0.2	HA17_0.2	HA18_0.5	HA19_0.2
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S22-Ma08627	S22-Ma08628	S22-Ma08629	S22-Ma08630
Date Sampled			Mar 02, 2022	Mar 02, 2022	Mar 02, 2022	Mar 02, 2022
Test/Reference	LOR	Unit				
Chloride						
	10	mg/kg	11	< 10	21	29
Conductivity (1:5 aqueous extract at 25°C as rec.)						
	10	uS/cm	50	19	150	210
pH (1:5 Aqueous extract at 25°C as rec.)						
	0.1	pH Units	8.7	7.5	7.2	8.3
Resistivity*						
	0.5	ohm.m	200	540	65	47
Sulphate (as SO4)						
	10	mg/kg	11	13	250	270
Magnesium (exchangeable)						
	0.1	meq/100g	1.6	1.6	10	2.8
Potassium (exchangeable)						
	0.1	meq/100g	0.5	0.2	0.8	1.0
Sodium (exchangeable)						
	0.1	meq/100g	1.4	0.3	2.4	3.9
% Moisture						
	1	%	15	6.9	22	19
Cation Exchange Capacity						
Calcium (exchangeable)						
	0.1	meq/100g	5.2	2.4	8.7	8.2
Actual Acidity (NLM-3.2)						
pH-KCL (NLM-3.1)						
	0.1	pH Units	6.4	5.4	5.5	6.4
Titratable Actual Acidity (NLM-3.2)						
	2	mol H+/t	< 2	7.0	12	< 2
Titratable Actual Acidity (NLM-3.2)						
	0.003	% pyrite S	< 0.003	0.010	0.020	< 0.003
Potential Acidity - Chromium Reducible Sulfur						
Chromium Reducible Sulfur (s-SCr) (NLM-2.1)^{S04}						
	0.005	% S	< 0.005	< 0.005	< 0.005	< 0.005
Chromium Reducible Sulfur (a-SCr) (NLM-2.1)						
	3	mol H+/t	< 3	< 3	< 3	< 3
Extractable Sulfur						
Sulfur - KCl Extractable						
	0.005	% S	N/A	N/A	N/A	N/A
HCl Extractable Sulfur						
	0.005	% S	N/A	N/A	N/A	N/A
Retained Acidity (S-NAS)						
Net Acid soluble sulfur (SNAS) NLM-4.1						
	0.02	% S	N/A	N/A	N/A	N/A
Net Acid soluble sulfur (s-SNAS) NLM-4.1^{S02}						
	0.02	% S	N/A	N/A	N/A	N/A
Net Acid soluble sulfur (a-SNAS) NLM-4.1						
	10	mol H+/t	N/A	N/A	N/A	N/A
HCl Extractable Sulfur Correction Factor						
	1	factor	2.0	2.0	2.0	2.0
Acid Neutralising Capacity (ANCbt)						
Acid Neutralising Capacity - (ANCbt) (NLM-5.2)						
	0.01	% CaCO3	N/A	N/A	N/A	N/A
Acid Neutralising Capacity - (s-ANCbt) (NLM-5.2)^{S03}						
	0.02	% S	N/A	N/A	N/A	N/A
Acid Neutralising Capacity - (a-ANCbt) (NLM-5.2)						
	2	mol H+/t	N/A	N/A	N/A	N/A
ANC Fineness Factor						
		factor	1.5	1.5	1.5	1.5
Net Acidity (Including ANC)						
CRS Suite - Net Acidity - NASSG (Including ANC)						
	0.02	% S	< 0.02	< 0.02	0.02	< 0.02
CRS Suite - Net Acidity - NASSG (Including ANC)						
	10	mol H+/t	< 10	< 10	12	< 10
CRS Suite - Liming Rate - NASSG (Including ANC)^{S01}						
	1	kg CaCO3/t	< 1	< 1	< 1	< 1

Client Sample ID			HA16_0.2	HA17_0.2	HA18_0.5	HA19_0.2
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S22-Ma08627	S22-Ma08628	S22-Ma08629	S22-Ma08630
Date Sampled			Mar 02, 2022	Mar 02, 2022	Mar 02, 2022	Mar 02, 2022
Test/Reference	LOR	Unit				
Extraneous Material						
<2mm Fraction	0.005	g	53	250	120	200
>2mm Fraction	0.005	g	< 0.005	18	8.5	6.1
Analysed Material	0.1	%	100	93	93	97
Extraneous Material	0.1	%	< 0.1	6.8	6.6	2.9

Client Sample ID			HA20_0.2	D01_220302	D02_220302
Sample Matrix			Soil	Soil	Soil
Eurofins Sample No.			S22-Ma08631	S22-Ma08632	S22-Ma08633
Date Sampled			Mar 02, 2022	Mar 02, 2022	Mar 02, 2022
Test/Reference	LOR	Unit			
Chloride					
	10	mg/kg	< 10	24	< 10
Conductivity (1:5 aqueous extract at 25°C as rec.)					
	10	uS/cm	11	180	18
pH (1:5 Aqueous extract at 25°C as rec.)					
	0.1	pH Units	5.1	8.5	5.0
Resistivity*					
	0.5	ohm.m	890	54	540
Sulphate (as SO4)					
	10	mg/kg	< 10	160	10
Magnesium (exchangeable)					
	0.1	meq/100g	< 0.1	2.6	0.1
Potassium (exchangeable)					
	0.1	meq/100g	0.2	0.9	0.2
Sodium (exchangeable)					
	0.1	meq/100g	< 0.1	3.6	< 0.1
% Moisture					
	1	%	16	20	7.3
Cation Exchange Capacity					
Calcium (exchangeable)					
	0.1	meq/100g	< 0.1	7.6	0.1
Actual Acidity (NLM-3.2)					
pH-KCL (NLM-3.1)					
	0.1	pH Units	4.2	6.2	4.8
Titrateable Actual Acidity (NLM-3.2)					
	2	mol H+/t	14	2.0	13
Titrateable Actual Acidity (NLM-3.2)					
	0.003	% pyrite S	0.020	< 0.003	0.020
Potential Acidity - Chromium Reducible Sulfur					
Chromium Reducible Sulfur (s-SCr) (NLM-2.1)^{S04}					
	0.005	% S	< 0.005	< 0.005	< 0.005
Chromium Reducible Sulfur (a-SCr) (NLM-2.1)					
	3	mol H+/t	< 3	< 3	< 3
Extractable Sulfur					
Sulfur - KCl Extractable					
	0.005	% S	< 0.005	N/A	N/A
HCl Extractable Sulfur					
	0.005	% S	< 0.005	N/A	N/A
Retained Acidity (S-NAS)					
Net Acid soluble sulfur (SNAS) NLM-4.1					
	0.02	% S	< 0.02	N/A	N/A
Net Acid soluble sulfur (s-SNAS) NLM-4.1^{S02}					
	0.02	% S	< 0.02	N/A	N/A
Net Acid soluble sulfur (a-SNAS) NLM-4.1					
	10	mol H+/t	< 10	N/A	N/A
HCl Extractable Sulfur Correction Factor					
	1	factor	2.0	2.0	2.0
Acid Neutralising Capacity (ANCbt)					
Acid Neutralising Capacity - (ANCbt) (NLM-5.2)					
	0.01	% CaCO3	N/A	N/A	N/A
Acid Neutralising Capacity - (s-ANCbt) (NLM-5.2)^{S03}					
	0.02	% S	N/A	N/A	N/A
Acid Neutralising Capacity - (a-ANCbt) (NLM-5.2)					
	2	mol H+/t	N/A	N/A	N/A
ANC Fineness Factor					
		factor	1.5	1.5	1.5
Net Acidity (Including ANC)					
CRS Suite - Net Acidity - NASSG (Including ANC)					
	0.02	% S	0.02	< 0.02	0.02
CRS Suite - Net Acidity - NASSG (Including ANC)					
	10	mol H+/t	14	< 10	13
CRS Suite - Liming Rate - NASSG (Including ANC)^{S01}					
	1	kg CaCO3/t	1.0	< 1	< 1

Client Sample ID			HA20_0.2	D01_220302	D02_220302
Sample Matrix			Soil	Soil	Soil
Eurofins Sample No.			S22-Ma08631	S22-Ma08632	S22-Ma08633
Date Sampled			Mar 02, 2022	Mar 02, 2022	Mar 02, 2022
Test/Reference	LOR	Unit			
Extraneous Material					
<2mm Fraction	0.005	g	63	110	96
>2mm Fraction	0.005	g	< 0.005	2.4	< 0.005
Analysed Material	0.1	%	100	98	100
Extraneous Material	0.1	%	< 0.1	2.1	< 0.1

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Chloride - Method: LTM-INO-4270 Anions by Ion Chromatography	Sydney	Mar 04, 2022	28 Days
- Method: LTM-INO-4090 Chloride by Discrete Analyser			
pH (1:5 Aqueous extract at 25°C as rec.) - Method: LTM-GEN-7090 pH by ISE	Sydney	Mar 04, 2022	7 Days
- Method: LTM-GEN-7090 pH in soil by ISE			
Sulphate (as SO ₄) - Method: In-house method LTM-INO-4270 Sulphate by Ion Chromatograph	Sydney	Mar 04, 2022	28 Days
- Method: LTM-INO-4110 Sulfate by Discrete Analyser			
Conductivity (1:5 aqueous extract at 25°C as rec.) - Method: LTM-INO-4030 Conductivity	Sydney	Mar 04, 2022	7 Days
Magnesium (exchangeable) - Method: LTM-MET-3060 Cation Exchange Capacity and ESP	Melbourne	Mar 08, 2022	180 Days
Potassium (exchangeable) - Method: LTM-MET-3060 Cation Exchange Capacity and ESP	Melbourne	Mar 08, 2022	180 Days
Sodium (exchangeable) - Method: LTM-MET-3060 Cation Exchange Capacity and ESP	Melbourne	Mar 08, 2022	180 Days
Cation Exchange Capacity - Method: LTM-MET-3060 Cation Exchange Capacity by bases & Exchangeable Sodium Percentage	Melbourne	Mar 08, 2022	28 Days
% Moisture - Method: LTM-GEN-7080 Moisture	Sydney	Mar 04, 2022	14 Days
Chromium Reducible Sulfur Suite			
Chromium Suite - Method: LTM-GEN-7070 Chromium Reducible Sulfur Suite	Brisbane	Mar 09, 2022	6 Week
Extraneous Material - Method: LTM-GEN-7050/7070	Brisbane	Mar 09, 2022	6 Week

Company Name:	ERM Hunter Valley	Order No.:	621304	Received:	Mar 3, 2022 7:59 PM
Address:	Level 1 / 45 Watt Street Newcastle NSW 2300	Report #:	868466	Due:	Mar 9, 2022
Project Name:	ETAMOGAH SALINITY AND ASS SOIL INVESTIGATION	Phone:	(02) 4964 2150	Priority:	3 Day
Project ID:	0621304	Fax:	(02) 4964 2152	Contact Name:	Peter Lavelle

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Aggressivity Soil Set	Aggressivity Soil Set	Exchangeable Cations	Chromium Reducible Sulfur Suite	Moisture Set	Moisture Set
Melbourne Laboratory - NATA # 1261 Site # 1254						X	X	X		X	X
Sydney Laboratory - NATA # 1261 Site # 18217						X	X	X		X	X
Brisbane Laboratory - NATA # 1261 Site # 20794									X		
Mayfield Laboratory - NATA # 1261 Site # 25079											
Perth Laboratory - NATA # 2377 Site # 2370											
External Laboratory											
No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID						
1	HA01_0.2	Mar 02, 2022		Soil	S22-Ma08611	X	X	X		X	
2	HA02_0.2	Mar 02, 2022		Soil	S22-Ma08612	X	X	X		X	
3	HA03_0.2	Mar 02, 2022		Soil	S22-Ma08613	X	X	X		X	
4	HA04_0.2	Mar 02, 2022		Soil	S22-Ma08614	X	X	X		X	
5	HA05_0.2	Mar 02, 2022		Soil	S22-Ma08615	X	X	X		X	
6	HA06_0.2	Mar 02, 2022		Soil	S22-Ma08616	X	X	X		X	
7	HA07_0.5	Mar 02, 2022		Soil	S22-Ma08617	X	X	X		X	
8	HA08_0.2	Mar 02, 2022		Soil	S22-Ma08618	X	X	X		X	
9	HA09_0.2	Mar 02, 2022		Soil	S22-Ma08619	X	X	X		X	

Company Name: ERM Hunter Valley
Address: Level 1 / 45 Watt Street
Newcastle
NSW 2300

Order No.: 621304
Report #: 868466
Phone: (02) 4964 2150
Fax: (02) 4964 2152

Received: Mar 3, 2022 7:59 PM
Due: Mar 9, 2022
Priority: 3 Day
Contact Name: Peter Lavelle

Project Name: ETAMOGAH SALINITY AND ASS SOIL INVESTIGATION
Project ID: 0621304

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Aggressivity Soil Set	Aggressivity Soil Set	Exchangeable Cations	Chromium Reducible Sulfur Suite	Moisture Set	Moisture Set
Melbourne Laboratory - NATA # 1261 Site # 1254						X	X	X		X	X
Sydney Laboratory - NATA # 1261 Site # 18217						X	X	X		X	X
Brisbane Laboratory - NATA # 1261 Site # 20794									X		
Mayfield Laboratory - NATA # 1261 Site # 25079											
Perth Laboratory - NATA # 2377 Site # 2370											
External Laboratory											
10	HA10_0.2	Mar 02, 2022		Soil	S22-Ma08620		X	X	X		X
11	HA11_0.2	Mar 02, 2022		Soil	S22-Ma08621		X	X	X		X
12	HA12_0.2	Mar 02, 2022		Soil	S22-Ma08622	X		X	X	X	
13	HA12_0.5	Mar 02, 2022		Soil	S22-Ma08623		X	X	X		X
14	HA13_0.1	Mar 02, 2022		Soil	S22-Ma08624		X	X	X		X
15	HA14_0.2	Mar 02, 2022		Soil	S22-Ma08625		X	X	X		X
16	HA15_0.5	Mar 02, 2022		Soil	S22-Ma08626		X	X	X		X
17	HA16_0.2	Mar 02, 2022		Soil	S22-Ma08627		X	X	X		X
18	HA17_0.2	Mar 02, 2022		Soil	S22-Ma08628		X	X	X		X
19	HA18_0.5	Mar 02, 2022		Soil	S22-Ma08629		X	X	X		X
20	HA19_0.2	Mar 02, 2022		Soil	S22-Ma08630		X	X	X		X

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Sample Detail						Aggressivity Soil Set	Aggressivity Soil Set	Exchangeable Cations	Chromium Reducible Sulfur Suite	Moisture Set	Moisture Set
Melbourne Laboratory - NATA # 1261 Site # 1254						X	X	X		X	X
Sydney Laboratory - NATA # 1261 Site # 18217						X	X	X		X	X
Brisbane Laboratory - NATA # 1261 Site # 20794									X		
Mayfield Laboratory - NATA # 1261 Site # 25079											
Perth Laboratory - NATA # 2377 Site # 2370											
External Laboratory											
21	HA20_0.2	Mar 02, 2022		Soil	S22-Ma08631		X	X	X		X
22	D01_220302	Mar 02, 2022		Soil	S22-Ma08632		X	X	X		X
23	D02_220302	Mar 02, 2022		Soil	S22-Ma08633		X	X	X		X
Test Counts						23	23	23	23	23	23

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

Units

mg/kg: milligrams per kilogram	mg/L: milligrams per litre	µg/L: micrograms per litre
ppm: parts per million	ppb: parts per billion	%: Percentage
org/100 mL: Organisms per 100 millilitres	NTU: Nephelometric Turbidity Units	MPN/100 mL: Most Probable Number of organisms per 100 millilitres

Terms

APHA	American Public Health Association
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
TBTO	Tributyltin oxide (<i>bis</i> -tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment however free tributyltin was measured and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 5.4
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should be used as a guide only and may be different when site specific Sampling Analysis and Quality Plan (SAQP) have been implemented

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR: No Limit

Results between 10-20 times the LOR: RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.4 where no positive PFAS results have been reported have been reviewed and no data was affected.

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
4. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery the term "INT" appears against that analyte.
5. For Matrix Spikes and LCS results a dash "-" in the report means that the specific analyte was not added to the QC sample.
6. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test				Units	Result 1		Acceptance Limits	Pass Limits	Qualifying Code
Method Blank									
Chloride				mg/kg	< 10		10	Pass	
Conductivity (1:5 aqueous extract at 25°C as rec.)				uS/cm	< 10		10	Pass	
Sulphate (as SO4)				mg/kg	< 10		10	Pass	
Magnesium (exchangeable)				meq/100g	< 0.1		0.1	Pass	
Potassium (exchangeable)				meq/100g	< 0.1		0.1	Pass	
Sodium (exchangeable)				meq/100g	< 0.1		0.1	Pass	
Method Blank									
Cation Exchange Capacity									
Calcium (exchangeable)				meq/100g	< 0.1		0.1	Pass	
LCS - % Recovery									
Chloride				%	100		70-130	Pass	
Conductivity (1:5 aqueous extract at 25°C as rec.)				%	94		70-130	Pass	
Resistivity*				%	94		70-130	Pass	
Sulphate (as SO4)				%	99		70-130	Pass	
LCS - % Recovery									
Actual Acidity (NLM-3.2)									
pH-KCL (NLM-3.1)				%	97		80-120	Pass	
Titratable Actual Acidity (NLM-3.2)				%	108		80-120	Pass	
LCS - % Recovery									
Potential Acidity - Chromium Reducible Sulfur									
Chromium Reducible Sulfur (s-SCr) (NLM-2.1)				%	98		80-120	Pass	
LCS - % Recovery									
Extractable Sulfur									
HCl Extractable Sulfur				%	131		80-120	Fail	
Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
					Result 1				
Chloride		S22-Ma10578	NCP	%	102		70-130	Pass	
Sulphate (as SO4)		S22-Ma10578	NCP	%	98		70-130	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
					Result 1	Result 2	RPD		
Chloride		S22-Fe14971	NCP	mg/kg	< 10	< 10	<1	30%	Pass
Sulphate (as SO4)		S22-Fe14971	NCP	mg/kg	< 10	< 10	<1	30%	Pass
Duplicate									
					Result 1	Result 2	RPD		
Actual Acidity (NLM-3.2)									
pH-KCL (NLM-3.1)		S22-Ma08611	CP	pH Units	4.5	4.5	<1	30%	Pass
Titratable Actual Acidity (NLM-3.2)		S22-Ma08611	CP	mol H+/t	48	50	3.0	30%	Pass
Titratable Actual Acidity (NLM-3.2)		S22-Ma08611	CP	% pyrite S	0.080	0.080	3.0	30%	Pass
Duplicate									
					Result 1	Result 2	RPD		
Potential Acidity - Chromium Reducible Sulfur									
Chromium Reducible Sulfur (s-SCr) (NLM-2.1)		S22-Ma08611	CP	% S	< 0.005	< 0.005	<1	30%	Pass
Chromium Reducible Sulfur (a-SCr) (NLM-2.1)		S22-Ma08611	CP	mol H+/t	< 3	< 3	<1	30%	Pass
Duplicate									
					Result 1	Result 2	RPD		
Extractable Sulfur									
Sulfur - KCl Extractable		S22-Ma08611	CP	% S	< 0.005	< 0.005	<1	30%	Pass
HCl Extractable Sulfur		S22-Ma08611	CP	% S	< 0.005	< 0.005	<1	30%	Pass

Duplicate								
Retained Acidity (S-NAS)				Result 1	Result 2	RPD		
Net Acid soluble sulfur (SNAS) NLM-4.1	S22-Ma08611	CP	% S	< 0.02	< 0.02	<1	30%	Pass
Net Acid soluble sulfur (s-SNAS) NLM-4.1	S22-Ma08611	CP	% S	< 0.02	< 0.02	<1	30%	Pass
Net Acid soluble sulfur (a-SNAS) NLM-4.1	S22-Ma08611	CP	mol H+/t	< 10	< 10	<1	30%	Pass
Duplicate								
Acid Neutralising Capacity (ANCbt)				Result 1	Result 2	RPD		
Acid Neutralising Capacity - (ANCbt) (NLM-5.2)	S22-Ma08611	CP	% CaCO ₃	N/A	N/A	N/A	30%	Pass
Acid Neutralising Capacity - (s-ANCbt) (NLM-5.2)	S22-Ma08611	CP	% S	N/A	N/A	N/A	30%	Pass
ANC Fineness Factor	S22-Ma08611	CP	factor	1.5	1.5	<1	30%	Pass
Duplicate								
Net Acidity (Including ANC)				Result 1	Result 2	RPD		
CRS Suite - Net Acidity - NASSG (Including ANC)	S22-Ma08611	CP	% S	0.08	0.08	3.0	30%	Pass
CRS Suite - Net Acidity - NASSG (Including ANC)	S22-Ma08611	CP	mol H+/t	48	50	3.0	30%	Pass
CRS Suite - Liming Rate - NASSG (Including ANC)	S22-Ma08611	CP	kg CaCO ₃ /t	3.6	3.7	3.0	30%	Pass
Duplicate								
Actual Acidity (NLM-3.2)				Result 1	Result 2	RPD		
pH-KCL (NLM-3.1)	S22-Ma08614	CP	pH Units	6.0	6.0	<1	30%	Pass
Titrateable Actual Acidity (NLM-3.2)	S22-Ma08614	CP	mol H+/t	4.0	4.0	<1	30%	Pass
Titrateable Actual Acidity (NLM-3.2)	S22-Ma08614	CP	% pyrite S	0.010	0.010	<1	30%	Pass
Duplicate								
Potential Acidity - Chromium Reducible Sulfur				Result 1	Result 2	RPD		
Chromium Reducible Sulfur (s-Scr) (NLM-2.1)	S22-Ma08614	CP	% S	< 0.005	< 0.005	<1	30%	Pass
Chromium Reducible Sulfur (a-Scr) (NLM-2.1)	S22-Ma08614	CP	mol H+/t	< 3	< 3	<1	30%	Pass
Duplicate								
Extractable Sulfur				Result 1	Result 2	RPD		
Sulfur - KCl Extractable	S22-Ma08614	CP	% S	N/A	N/A	N/A	30%	Pass
HCl Extractable Sulfur	S22-Ma08614	CP	% S	N/A	N/A	N/A	30%	Pass
Duplicate								
Retained Acidity (S-NAS)				Result 1	Result 2	RPD		
Net Acid soluble sulfur (SNAS) NLM-4.1	S22-Ma08614	CP	% S	N/A	N/A	N/A	30%	Pass
Net Acid soluble sulfur (s-SNAS) NLM-4.1	S22-Ma08614	CP	% S	N/A	N/A	N/A	30%	Pass
Net Acid soluble sulfur (a-SNAS) NLM-4.1	S22-Ma08614	CP	mol H+/t	N/A	N/A	N/A	30%	Pass
Duplicate								
Acid Neutralising Capacity (ANCbt)				Result 1	Result 2	RPD		
Acid Neutralising Capacity - (ANCbt) (NLM-5.2)	S22-Ma08614	CP	% CaCO ₃	N/A	N/A	N/A	30%	Pass
Acid Neutralising Capacity - (s-ANCbt) (NLM-5.2)	S22-Ma08614	CP	% S	N/A	N/A	N/A	30%	Pass
ANC Fineness Factor	S22-Ma08614	CP	factor	1.5	1.5	<1	30%	Pass
Duplicate								
Net Acidity (Including ANC)				Result 1	Result 2	RPD		
CRS Suite - Net Acidity - NASSG (Including ANC)	S22-Ma08614	CP	% S	< 0.02	< 0.02	<1	30%	Pass
CRS Suite - Net Acidity - NASSG (Including ANC)	S22-Ma08614	CP	mol H+/t	< 10	< 10	<1	30%	Pass
CRS Suite - Liming Rate - NASSG (Including ANC)	S22-Ma08614	CP	kg CaCO ₃ /t	< 1	< 1	<1	30%	Pass

Duplicate				Result 1	Result 2	RPD		
% Moisture	S22-Ma08615	CP	%	14	14	2.0	30%	Pass
Duplicate				Result 1	Result 2	RPD		
Conductivity (1:5 aqueous extract at 25°C as rec.)	S22-Ma08621	CP	uS/cm	12	15	22	30%	Pass
pH (1:5 Aqueous extract at 25°C as rec.)	S22-Ma08621	CP	pH Units	7.0	7.0	<1	30%	Pass
Resistivity*	S22-Ma08621	CP	ohm.m	840	670	22	30%	Pass
Magnesium (exchangeable)	S22-Ma08621	CP	meq/100g	0.9	0.9	3.0	30%	Pass
Potassium (exchangeable)	S22-Ma08621	CP	meq/100g	0.5	0.4	6.0	30%	Pass
Sodium (exchangeable)	S22-Ma08621	CP	meq/100g	< 0.1	< 0.1	<1	30%	Pass
Duplicate				Result 1	Result 2	RPD		
Cation Exchange Capacity				Result 1	Result 2	RPD		
Calcium (exchangeable)	S22-Ma08621	CP	meq/100g	4.9	4.6	7.0	30%	Pass
Duplicate				Result 1	Result 2	RPD		
Actual Acidity (NLM-3.2)				Result 1	Result 2	RPD		
pH-KCL (NLM-3.1)	S22-Ma08623	CP	pH Units	5.5	5.5	<1	30%	Pass
Titrateable Actual Acidity (NLM-3.2)	S22-Ma08623	CP	mol H+/t	13	13	<1	30%	Pass
Titrateable Actual Acidity (NLM-3.2)	S22-Ma08623	CP	% pyrite S	0.020	0.020	<1	30%	Pass
Duplicate				Result 1	Result 2	RPD		
Potential Acidity - Chromium Reducible Sulfur				Result 1	Result 2	RPD		
Chromium Reducible Sulfur (s-SCr) (NLM-2.1)	S22-Ma08623	CP	% S	< 0.005	< 0.005	<1	30%	Pass
Chromium Reducible Sulfur (a-SCr) (NLM-2.1)	S22-Ma08623	CP	mol H+/t	< 3	< 3	<1	30%	Pass
Duplicate				Result 1	Result 2	RPD		
Extractable Sulfur				Result 1	Result 2	RPD		
Sulfur - KCl Extractable	S22-Ma08623	CP	% S	N/A	N/A	N/A	30%	Pass
HCl Extractable Sulfur	S22-Ma08623	CP	% S	N/A	N/A	N/A	30%	Pass
Duplicate				Result 1	Result 2	RPD		
Retained Acidity (S-NAS)				Result 1	Result 2	RPD		
Net Acid soluble sulfur (SNAS) NLM-4.1	S22-Ma08623	CP	% S	N/A	N/A	N/A	30%	Pass
Net Acid soluble sulfur (s-SNAS) NLM-4.1	S22-Ma08623	CP	% S	N/A	N/A	N/A	30%	Pass
Net Acid soluble sulfur (a-SNAS) NLM-4.1	S22-Ma08623	CP	mol H+/t	N/A	N/A	N/A	30%	Pass
Duplicate				Result 1	Result 2	RPD		
Acid Neutralising Capacity (ANCbt)				Result 1	Result 2	RPD		
Acid Neutralising Capacity - (ANCbt) (NLM-5.2)	S22-Ma08623	CP	% CaCO3	N/A	N/A	N/A	30%	Pass
Acid Neutralising Capacity - (s-ANCbt) (NLM-5.2)	S22-Ma08623	CP	% S	N/A	N/A	N/A	30%	Pass
ANC Fineness Factor	S22-Ma08623	CP	factor	1.5	1.5	<1	30%	Pass
Duplicate				Result 1	Result 2	RPD		
Net Acidity (Including ANC)				Result 1	Result 2	RPD		
CRS Suite - Net Acidity - NASSG (Including ANC)	S22-Ma08623	CP	% S	0.02	0.02	<1	30%	Pass
CRS Suite - Net Acidity - NASSG (Including ANC)	S22-Ma08623	CP	mol H+/t	13	13	<1	30%	Pass
CRS Suite - Liming Rate - NASSG (Including ANC)	S22-Ma08623	CP	kg CaCO3/t	1.0	< 1	<1	30%	Pass
Duplicate				Result 1	Result 2	RPD		
% Moisture	S22-Ma08626	CP	%	19	18	5.0	30%	Pass

Comments

Eurofins | Environment Testing accreditation number 1261, site 18217 is currently in progress of a controlled transition to a new custom built location at 179 Magowar Road, Girraween, NSW 2145. All results on this report denoted as being performed by Eurofins | Environment Testing Unit F3, Building F, 16 Mars road, Lane Cove West, NSW 2066, corporate site 18217, will have been performed on either Lane Cove or new Girraween site

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
S01	Liming rate is calculated and reported on a dry weight basis assuming use of fine agricultural lime (CaCO3) and using a safety factor of 1.5 to allow for non-homogeneous mixing and poor reactivity of lime. For conversion of Liming Rate from 'kg/t dry weight' to 'kg/m3 in-situ soil' multiply 'reported results' x 'wet bulk density of soil in t/m3'
S02	Retained Acidity is Reported when the pHKCl is less than pH 4.5
S03	Acid Neutralising Capacity is only required if the pHKCl if greater than or equal to pH 6.5
S04	Acid Sulfate Soil Samples have a 24 hour holding time unless frozen or dried within that period

Authorised by:

Andrew Black	Analytical Services Manager
Charl Du Preez	Senior Analyst-Inorganic (NSW)
Scott Beddoes	Senior Analyst-Inorganic (VIC)
Myles Clark	Senior Analyst-SPOCAS (QLD)
Emily Rosenberg	Senior Analyst-Metal (VIC)



Glenn Jackson
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please [click here](#).

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